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Crosse (R.), McWilliam (R.), Rhodes (A.), & Dunn (A. T.). **Antifungal action of streptomycin-copper chelate against Phytophthora infestans on Tomato (Lycopersicon esculentum).**—*Ann. appl. Biol.*, **48**, 2, pp. 270–278, 1 graph, 1960. [11 ref.]

At Glaxo Labs. Ltd., Sefton Park, Stoke Poges, Bucks., the antifungal protection afforded by streptomycin-Cu chelate *in vivo* in greenhouse tests against *P. infestans* on tomato plants was 6 times that given by streptomycin sulphate. The chelate was also much more resistant to simulated rainfall. In similar tests streptomycin-Cu chelate (for an equivalent streptomycin content) was 2½–5 times as effective as an antifungal prophylactic spray than zineb and 50 times as active as Cu oxychloride as a commercial 50% wettable powder. The 3 materials displayed similar resistance to weathering by 'rainfall', and it was assumed, therefore, that approx. 250 i.u./ml. streptomycin as streptomycin-Cu chelate would give the same degree of protection against *P. infestans* in the field as would the usual field rates of application of zineb and Cu oxychloride. The results of field tests to determine whether this is in fact the case were not available at the time of writing.

Corden (M. E.) & Edgington (L. V.). **A calcium requirement for growth-regulator-induced resistance to Fusarium wilt of Tomato.**—*Phytopathology*, **50**, 8 (1), pp. 625–626, 1 fig., 1960.

At Conn. agric. Exp. Sta., New Haven, half of the Bonny Best tomato plants in Hoagland's solution containing low Ca (20 p.p.m.), normal (200), or high (1,000) received α-naphthaleneacetic acid at 10^{-6} M, the remainder serving as controls. Subsequent inoculation with *F. oxysporum* f. [*F. bulbigenum* var.] *lycopersici* showed that resistance to wilt induced by the growth regulator [**38**, 544] requires Ca and is enhanced by levels higher than those necessary for normal plant growth [cf. **37**, 739]. A possible interpretation of this effect is outlined.

Stoll (K.). **Neue Krankheitserreger in den nördlichen Wuchsbezirken der DDR.** [New causal agents of diseases in the northern districts of the German Democratic Republic.]—*Forst u. Jagd*, **9**, 6, pp. 253–256, 1959.

In this survey by Deutsche Akademie der Landwirtschaftswissenschaften, Berlin, 2 tracheomycoses are noted, viz. the widespread epidemic damping-off of oak seedlings and verticilliosis (*Verticillium* sp.) on 2–3-yr.-old wild 'sand' birch plants in Eberswalde, reported also to threaten maple [*Acer* sp.], horse chestnut, elm, lime [*Tilia*], and hazel. In certain localities [given] a revival of Swedish pine cast caused by *Hypodermella sulcigena* has been observed since 1956, even on trees resistant to *Lophodermium* [*pinastri*] infection, and of an incidence of *Rhizosphaera kalkhoffii* on *Picea engelmannii*, blue spruce (*P. pungens*) and, in combination with *Allantophoma* sp., on 2-yr.-old Douglas fir [*Pseudotsuga menziesii*] seedlings in nurseries. *Sclerophoma pithyophila*, known as yet chiefly as a parasite of larch needles [cf. **37**, 189], was reported to occur in mature pine stands in several places. Attacks of mildew (*Microsphaera alphitoides*) [cf. **36**, 672] on 1-yr.-old red oak seedlings, noticed only in the last few years, have increased: in 1956 there was 20%, in 1958 50% incidence in enclosures under observation. On the other hand, infection of red oak by *Pestalotia truncata* [cf. **37**, 423] and *Discosia artocreas* was only sporadic and *Septogloeum populiperdum* on poplar made no appreciable spread. In S. and W. suburban districts of Berlin a disease of blue spruce was found to be caused by *P. versicolor*, which was isolated from peripheral roots of apparently healthy trees.

Zwolińska (Mme Z.). **Nieznane zjawisko zachodzące w patologicznych utworach owocostanów Olszy Szarej (Alnus incana (L.) Mnch.).** [An unknown phenomenon occurring in pathological outgrowths on the fruiting catkins of Grey Alder (*A. incana*).]—*Roczn. Dendrol.*, **13**, pp. 111–118, 1959. [*For. Abstr.*, **21**, 1, p. 84, 1960.]

The 1st record of *Taphrina alni-incanae* [cf. **18**, 415] for Poland. The structure of the outgrowths is illustrated and discussed.

Krstić (M.). **O obimu truleži Bukovih debala u Južnom Kučaju.** [The extent of the decay of Beech stems in Južni Kučaj.]—*Šumarstvo*, **12**, 1–2, pp. 13–27, 1959. [Eng. summ. *For. Abstr.*, **21**, 11, p. 81, 1960.]

In 18 beech trunks infected by *Fomes fomentarius* [cf. **36**, 670] the extent of decay present was indicated less by the number of fruiting bodies than by their distribution. Attacks up to 4 m. from the ground rendered all the trunk below this height of poor value; above this height the extent of decay was related to the resistance of the trunk to frost and heat. The vol. of completely useless wood depended on the amount of heartwood rot. At the level of the fruiting bodies some 50% of the wood was attacked and was generally useless.

Report of the Fourth Session of the International Chestnut Commission (Yugoslavia and Greece, September–October, 1958).—FAO/CH/26, 56 pp., 1 map, [1959. Mimeographed.]

The general report of the Commission (pp. 1–13), on which France, Italy, Portugal, Spain, Switzerland, and Yugoslavia were represented, deals *inter alia* with the spread and control of ink disease (*Phytophthora cinnamomi* and *P. cambivora*) and blight (*Endothia parasitica*) [cf. **39**, 505, 506] in these countries. This is followed by 9 appendixes, of which no. 6 (pp. 43–45), by M. Krstić, J. Grente, & G. Solignat, is a note on *E. parasitica* in Yugoslavia, where the disease now affects oak (*Quercus robur*) and the selection of resistant types of chestnut is being made.

Converse (R. H.). **Physiologic specialization of Fusicladium effusum and its evaluation in vitro.**—*Phytopathology*, **50**, 7, pp. 527–531, 1960.

At Okla State Univ., Stillwater, pathogenicity tests in the greenhouse with cultures of *Fusicladium effusum* [cf. **38**, 719] from Squirrel, Western, and Sovereign pecan to these vars. and to Burkett indicated the occurrence of 3 physiologic races [cf. **8**, 585]. Natural field inocula from Squirrel and Burkett, unable to parasitize Western, were regarded as representing a 4th race. In addition, 4 isolates from 4 eastern pecan vars. failed in the greenhouse to parasitize vars. other than their original hosts and their relation to other races [cf. **36**, 73] is unknown. With all isolates self-inoculation gave the highest number of normal, sporulating lesions; cross-inoculations often resulted in abnormal lesions which sporulated poorly or not at all.

When conidia from 4 sources were germinated on water agar in the presence of leaflet disks from 5 pecan vars. germ tubes were longer with 'own' than with 'other' disks (av. difference 38 μ, max. 101). In general, however, the lengths fell into categories that could be predicted by the pathogenicity of the conidia.

Dance (B. W.). **The taxonomy of fungi causing leaf and twig blights of North American Poplars.**—*Proc. 6th Mtg Comm. For. Tree Breeding, Can., Montreal*, Part 2, pp. *R* 15–*R* 17, 1958. [*For. Abstr.*, **21**, 11, p. 84, 1960.]

The fungi involved are *Venturia populina* and *V. tremulae* [**39**, 444].

Schönhar (S.). **Erfahrungen bei der Bekämpfung der Kiefernschütte in Südwestdeutschland.** [Experience in the control of Pine leaf cast in South-West Germany.]—*Allg. Forstz.*, **14**, 18, pp. 351–352, 1 fig., 1959.

This note from the Abteilung der Phytopathologie der Baden-Württembergischen

Forstlichen Versuchs- und Forschungsanstalt reports heavy attacks of *Lophodermium pinastri* on pine [**39**, 509] in the 4 yr. before 1959, particularly 1957, when over large areas all trees of 8 yr. or less were practically defoliated. In Baden-Württemberg and Rheinland-Pfalz more than 3,000 ha. were sprayed, mainly with zineb [cf. **37**, 744]. In the nurseries 3–5 applications were necessary, according to the weather, while for the field plantings 2 were generally sufficient. In one particularly heavy attack at Trier, in spring 1957, when trees of 12 yr. or less lost up to 90% of their leaves, a single helicopter spraying was entirely successful with 6–12 yr. trees, though some of the 2–5 yr. ones were heavily attacked again later in the season.

Stoll (K.). **Neuzeitliche Möglichkeiten der Kieferschüttebekämpfung auf chemisch-prophylaktischem Wege.** [Modern possibilities of the control of Pine needle cast by a prophylactic application of chemicals.]—*Forst u. Jagd*, **9**, 3, pp. 133–136, 1959.

At Deutsche Akademie der Landwirtschaftswissenschaften, Berlin, promising protection from *Lophodermium pinastri* [**39**, 635] was obtained by the thiocarbamates, especially those of the zineb group, the cost of which, however, precludes their universal use. Of others fuclasin F 50 and defusit 50 (rhodandinitrobenzole) were effective. The form of application proved to be of utmost importance: liquid and mist sprays were generally superior to dusting. Some chemicals, including the thiocarbamates and fuclasin, showed poor adherence and need stickers, particularly during a rainy season.

Diller (J. D.) & Koch (E. J.). **Spread of a 'house decay' fungus through soil to a standing Virginia Pine tree.**—Abs. in *Phytopathology*, **50**, 8 (1), p. 571, 1960.

Infection of a living tree of *Pinus virginiana* by *Poria incrassata*, grown under mounds of leaves [**39**, 253] in a wooded area at Beltsville, Md, apparently constitutes the 1st record of this fungus attacking standing timber.

Levisohn (Ida). **Effects of Gibberella fujikuroi on fungal root-infections of Pinus.**—*Nature, Lond.*, **186**, 4729, pp. 987–988, 1960.

In the Dept Botany, Bedford Coll., Univ. London, potted seedlings of *P. sylvestris* in 3 different soils were inoculated with *G. fujikuroi* at sowing, and twice more at monthly intervals. Treated seedlings showed depressed development 3 months from sowing accompanied by an alteration in the proportions of the different root-associations. The presence of *Gibberella* in podsol A stimulated the formation of subnormal mycorrhizas at the expense of the normal associations, which in the controls were present in equal amounts. In podsol B a decrease in true mycorrhizal infection and a corresponding increase in a parasitic association with *Rhizoctonia sylvestris* [**36**, 794] was observed in treated seedlings. In the agricultural soil the inoculated cultures exhibited an increase in haustorial infection accompanied by a decrease in mycorrhizas. In 8-month-old seedlings the differences between treated and untreated cultures had lessened considerably.

In vitro 100 p.p.m. gibberellic acid in an agar medium inhibited the growth of mycorrhizal fungi, including *Boletus granulatus*, *B. scaber*, *Rhizopogon luteolus*, and the parasitic *Rhizoctonia sylvestris*, as also did *G. fujikuroi* in mixed culture with these organisms.

Slankis (V.). **Mycorrhiza of forest trees.**—*For. Soils Conf., Sept. 8–11, 1958*, pp. 130–137, [? 1960. 93 ref.]

A brief review of the general morphological and anatomical characteristics of mycorrhizal roots and their role in the nutrition of the tree.

Slankis (V.). **The role of auxin and other exudates in mycorrhizal symbiosis of forest trees.**—Ex *The Physiology of Forest Trees* (Symposium at Harvard Forest, Apr., 1957), pp. 427–443, 5 fig., New York, Ronald Press Co., 1958. [87 ref.]

The author reviews the literature and reports on experiments which demonstrated a close relationship between the degree of deviation in root morphology of pine (*Pinus sylvestris* and *P. strobus*) and the conc. of auxin applied [cf. **39**, 627].

White (P. R.). **An epiphytotic tumour of White Spruce, Picea glauca.**—Ex *The Physiology of Forest Trees* (Symposium at Harvard Forest, Apr., 1957), pp. 493–510, 9 fig., 1 map, New York, Ronald Press Co., 1958.

The tumours 1st noted, on Mount Desert Island, Maine, U.S.A., were massive, hemispherical or subglobose structures, often of great size, with smooth, unfissured bark, growing on the trunks or lower branches of mature trees. The smallest ones, 4–5 yr. old, were recognizable as hard lumps under the bark of twigs ½ cm. or less diam. When the bark was stripped a smooth, elongated protuberance of the shape and size of ½ a grain of rice was revealed. In T.S. a wedge of visibly different wood was seen. Red or black spruce, both of which grow in the same general region, never bore tumours.

The distribution of affected trees is strikingly limited, being mostly in exposed locations, especially on surf-washed headlands or islands, rarely inland or in sheltered places. On any given tree there may be only a single growth, or a few, or a tree may be so heavily affected that hardly a twig escapes. All woody parts including the roots are affected but tumours are most common near the ground and rare in the upper half. Authentic reports of such growths have been received from similar locations along the Atlantic coast from Kittery, Maine, to Newfoundland, and of similar growths on Sitka spruce from Puget Sound to Alaska, but there has not been a report from the interior of Maine. Similar growths are also common on white spruce round Lake Louise in the Canadian Rockies and in the Isle Royale National Park on the north shore of Lake Superior. So far the cause of the growths is unknown. Tumour tissue in culture is physiologically unstable and heterogeneous and thus unlike uniform healthy tissue, but reminiscent of unstable hybrid tissue.

New vegetable varieties. List VI.—*Proc. Amer. Soc. hort. Sci.*, **75**, pp. 842–850, 1960.

New vars. [cf. **37**, 746] not already noticed from elsewhere include Waltham Washington asparagus introduced in 1956, resistant to rust [*Puccinia asparagi*: **38**, 644]. Three new beans [*Phaseolus vulgaris*] are resistant to common bean mosaic [virus: **37**, 746]: Tendercrop (1958), also resistant to NY 15 virus [str. of bean mosaic virus] and pod mottle virus [**37**, 62], Gardengreen (1959), also tolerant of root rot [**39**, 363], and Longval (1959), also fairly tolerant of [beet] curly top [virus]. Lima bean [*P. lunatus*] U.S. 255, introduced in 1959, is resistant to downy mildew [*Phytophthora phaseoli*: **37**, 619]. Resistance to yellows [*Fusarium conglutinans*: **39**, 68] is claimed for Rohnert's Early Red cabbage, introduced in 1958.

The cucumbers Ashe (N.C. 6) and Fletcher (N.C. 2), both introduced in 1959, are resistant to scab [*Cladosporium cucumerinum*: **38**, 442] and downy mildew [*Pseudoperonospora cubensis*: **38**, 457], and Golden State Pickle (1956) is resistant to cucumber mosaic [virus: **38**, 442]. Among new lettuces resistant to or tolerant of tipburn [**35**, 265] are Empire (1957), Sweetheart (1957), Golden State A and B (1958), Lakeland (1958), Climax (1959), and Golden State C and D (1959). The muskmelon Spartan Rock (1958) is resistant to *F.* [*bulbigenum* var. *niveum*: **38**, 725]. The shallot Delta Giant (1957) is resistant to leaf spot [? *Heterosporium allii*] and [unspecified] die-back.

Among the tomatoes, Anahu (1957) and Kolea (1957) are resistant to wilt, *F.* [*bulbigenum* var. *lycopersici*: **37**, 746], and tomato spotted wilt virus [**37**, 28]. Big Red (1959) possesses moderate resistance to *F.b.* var. *lycopersici*.

BROADBENT (L.). **Infectivity of aphids bred on virus-infected Cauliflower plants.**—*Ann. appl. Biol.*, **48**, 2, pp. 377–383, 1960. [29 ref.]

At Rothamsted exp. Sta. caged cauliflower plants infected with cabbage black ring spot virus (CBRSV) or cauliflower mosaic virus (ClMV) were colonized with *Myzus persicae* or *Brevicoryne brassicae* and winged and wingless aphids that voluntarily flew or walked away from the plants were transferred singly to healthy cauliflower or other brassica seedlings and their feeding behaviour and ability to transmit the viruses compared. ClMV was more readily transmitted by both spp. and CBRSV rarely by *B. brassicae* (never by wingless ones, which with both spp. transmitted less than winged aphids). CBRSV was transmitted less from old than young plants, but plant age did not affect ClMV transmission.

BAKER (P. F.). **Aphid behaviour on healthy and on yellows-virus-infected Sugar Beet.**—*Ann. appl. Biol.*, **48**, 2, pp. 384–391, 2 graphs, 1960.

Experiments at Rothamsted Field Sta., Dunholme, near Lincoln, are described in which *Myzus persicae*, *M. ascalonicus*, *Aphis fabae*, and *Aulacorthum solani* when caged on sugar-beet leaves in the greenhouse were found to prefer leaves severely infected with yellows virus to healthy ones, breeding more rapidly and living longer on them.

CORNFORD (C. E.). **British records, 42.**—*Trans. Brit. mycol. Soc.*, **43**, 1, p. 155, 1 pl. (3 fig.), 1960.

Paecilomyces betae (Delacroix) Cornford, a comb. nov., was reported at Dunholme, Lincs., on dried stems of wild and sugar beet (*Beta vulgaris*) [**32**, 414] infected by *Pleospora betae* [**38**, 47].

BUXTON (E. W.). **Effects of Pea root exudate on the antagonism of some rhizosphere micro-organisms towards Fusarium oxysporum f. pisi.**—*J. gen. Microbiol.*, **22**, pp. 678–689, 1 pl. (4 fig.), 1 diag., 14 graphs, 1960.

A detailed account of further studies at Rothamsted exp. Sta. already noticed [**40**, 3].

LOCKWOOD (J. L.). **Pea introductions with partial resistance to Aphanomyces root rot.**—*Phytopathology*, **50**, 8 (1), pp. 621–624, 7 graphs, 1960.

The results of trials at Mich. State Univ., E. Lansing, for resistance to *A. euteiches* [**38**, 722; **39**, 757] are set out. Several pea introductions showed marked resistance under variable conditions of zoospore conc., age at inoculation, temp. of rooting medium, isolate, and age of culture. P.I. 180693 and P.I. 169604 were less severely diseased than the susceptible Miragreen when grown in the greenhouse in steamed, infested soil. Isolate 102 of the pathogen appeared to represent a race pathogenically distinct from the other 3 used.

DEVARALL (B.). **A study of the growth of Botrytis spp. in leaves of field Bean.**—Abs. in *Trans. Brit. mycol. Soc.*, **43**, 2, pp. 462–463, 1960.

This paper notes that using a syringe technique a given number of *B. fabae* spores [cf. Leach, **35**, 112] in an infection drop was more likely to produce a lesion on a broad bean leaf than the same number of *B. cinerea* spores [loc. cit.]. Usually the greater the number of spores the higher the probability of lesion development. Plants deficient in Ca, Mg, K, or P were more susceptible than normal ones. The addition of sugars (especially glucose and mannose) to the infection drops increased lesion production.

ZAUMEYER (W. J.), THOMAS (H. R.), & AFANASIEV (M. M.). **A new disease-resistant Great Northern Bean.**—Abs. in *Phytopathology*, **50**, 8 (1), p. 574, 1960.

Great Northern 1140 [*Phaseolus vulgaris*] is immune from bean common mosaic virus and its New York 15 str., is resistant to many races of bean rust [*Uromyces appendiculatus*], and by its habit should escape *Sclerotinia* [*sclerotiorum*] wilt. It is being released by U.S. Dept Agric. and the Mont. and Idaho agric. Exp. Stas.

LESLEY (S. M.) & HOCHSTER (R. M.). **The extracellular polysaccharide of Xanthomonas phaseoli.**—*Canad. J. Biochem. Physiol.*, **37**, 4, pp. 513–529, 3 diag., 2 graphs, 1959. [33 ref.]

The objective of this study at the Canad. Dept Agric., Ottawa, on the mechanism of synthesis of the complex heteropolysaccharide produced by *X. phaseoli* is to determine its function in the invasion of the bean [*Phaseolus vulgaris*] by the bacterium. The substance was purified and shown to be homogeneous by examination in the analytical ultracentrifuge, moving boundary electrophoresis, and gradient precipitation with ethanol. After hydrolysis the constituent sugars were isolated and identified as the crystalline derivatives of D-glucose and D-mannose and as the crystalline lactone of D-glucuronic acid. These hexoses were found to occur in the relative proportions of 1:1:1.

The results of a preliminary investigation in which C^{14}-labelled glucose was supplied to rapidly growing cells indicate the improbability of the formation of a single 6-C precursor whence all 3 sugar components of the polysaccharide are synthesized directly.

WESTER (R. E.). **Resistance to stem anthracnose of Lima Beans.**—Abs. in *Phytopathology*, **50**, 8 (1), pp. 573–574, 1960.

An introduction of *Phaseolus lunatus* from British Guiana (P.I. 199,791) and another from S. Africa (P.I. 186,984) showed resistance to *Colletotrichum truncatum* [cf. **30**, 209; **33**, 637], which was lacking in all commercial vars. tested, and are to be used in a breeding programme [at U.S. Dept Agric., Beltsville, Md].

CRITTENDEN (H. W.) & BLOSS (H. W.). **Control of Cercospora kikuchii and Diaporthe phaseolorum var. sojae on Soybean seed.**—Abs. in *Phytopathology*, **50**, 8 (1), p. 570, 1960.

Weekly sprays of zineb or tribasic $CuSO_4$ (2 lb.) on Clark soybean during the flowering period in 1959 gave good control of *C. kikuchii* [cf. **39**, 68], 4 applications sufficing. Zineb gave the better control of *D.p.* var. *sojae* [cf. **39**, 364], but 6 applications were necessary for good results.

MURAKISHI (H. H.), HONMA (S.), & KNUTSON (R.). **Inoculum production and seedling evaluation of Celery for resistance to Cercospora apii.**—*Phytopathology*, **50**, 8 (1), pp. 605–607, 1960.

Further details from Dept Hort., Mich. State Univ., E. Lansing, of information already noticed [**39**, 206].

GANDY (DOREEN G.). **A transmissible disease of cultivated Mushrooms ('watery stipe').**—*Ann. appl. Biol.*, **48**, 2, pp. 427–430, 1960.

The substance of this paper has been noticed [**39**, 530].

Douzième Symposium international de Phytiatrie et de Phytopharmacie, Gand, Belgique, 26 April, 1960. [Twelfth International Symposium of Phytiatry and Phytopharmacy, Ghent, Belgium, 26 April, 1960.]

Of 25 papers [of which Engl. summ. (mimeographed) were received] dealing

with plant pathology (Sect. B), fungicides (Sect. C), and phytopathological work overseas (Sect. G), the following may be mentioned.

M. Heimann (Inst. für PflanzKrankh., Geisenheim, [Germany]): **Investigations on the cause and control of the 'dying-off' of Ericas** (pp. 98–99). Death of the roots of *Erica gracilis* and other *E.* spp. is caused by *Olpidium brassicae* [cf. **37**, 239]; a characteristic symptom is the gradual death of the plants. *Phytophthora* sp., probably *P. cinnamomi* [**39**, 415], causes the whole plant to turn grey-green; the leaves lie along the stem axis, the shoots wither from the tip, and the plants soon die. 'Dying-off' due to *Pestalotia versicolor*, producing similar symptoms to *Phytophthora*, was also common until a few yr. ago near Frankfurt. These fungi may be present together in diseased or dead plants. Control is by soil sterilization and strict hygiene.

J. Grosjean (Inst. voor Plantenziektendkundig Onderzoek, Wageningen): **Investigations on silver leaf disease of fruit trees** (pp. 99–100). Salicylic acid, applied to the soil or by spraying, had a beneficial effect, and Fe compounds, especially ferrous sulphate combined with salicylic acid, induced a slow but progressive recovery of fruit trees attacked by *Stereum purpureum* [**39**, 598].

A. H. M. Kirby & E. L. Frick (East Malling Res. Sta., Kent, England): **A glasshouse method for studying the effects of chemicals on the incidence of powdery mildews** (p. 104). A large settling-tower has been constructed to permit even inoculation of up to 100 potted apple rootstocks at a time with powdery mildew [*Podosphaera leucotricha*: **39**, 651] spores, and a similar apparatus to study *Erysiphe graminis* on barley. Chemicals may be applied by dipping before infecting the plants.

M. J. Koopmans (N. V. Philips-Duphar, 's-Graveland, Netherlands): **5-amino, 1-bis (dimethylamido) phosphoryltriazoles as systemic fungicides** (p. 104). It was found that the 3-pentyl and the 3-phenyl derivatives gave good protection against *P. leucotricha* on apple and *E. graminis* on barley, both as sprays or root applications. Conidia of these fungi were not affected by the chemicals *in vitro*.

J. Betgem (N. V. Philips-Duphar, Amsterdam, Netherlands): **Practical experience with bis-dialkyl-amido-phosphoryl-aminotriazoles** (p. 105). The new systemic, synthetic fungicide WP-155 controlled powdery mildew of roses [*Sphaerotheca pannosa*].

A. Busschots (Opzoekingsstation van Gorsem, St Truiden, Belgium): **Fungicidal and by-effects of dinitrochloronaphtalene (CDN) on Potatoes and Tomatoes** (pp. 105–106). In many cases CDN gave better control of *Phytophthora infestans* on potato than zineb and Cu preparations but the latter are still the most effective for residual action. Against *Cladosporium fulvum* and *P. infestans* on tomatoes in the field and in glasshouses CDN gave much better results than the standard fungicides. On potatoes and tomatoes the yield increases were 5–10% more than with zineb or Cu preparations.

C. Volger (Forstl. Fakultat. Hann.-Munden, W. Germany): **Experiments on the systemic-fungicidal activity of TMTM, TMTO, G 33 and PTO in conifer seed treatments** (p. 106). The sap of *Pinus sylvestris* seedlings from seed soaked in aqueous solutions of 3 dithiocarbamic acid derivatives, TMTM, TMTO, and G 33, or in PTO exerted an adverse effect on cultures of *Botrytis* sp. [cf. **37**, 743].

G. Van Outrive (Stanleyville) gave an account of the most important pests and diseases of coffee in the Eastern Province of the Belgian Congo (p. 127) and A. Vanderweyen (Yangambi) described a method of assessing the resistance of maize to some cryptogamic diseases by artificial inoculation tests in the field (pp. 130–131).

[Summaries in French by E. Laville of some of the papers read at this Symposium appear in *Fruits d'outre-mer*, **15**, 5, pp. 242–245, 1960.]

XI планово-методическое совещание по научно-исследовательской работе по защите растений в северо-западной зоне СССР. 25–29 ноября 1958 года. Тезисы докладов. [The 11th conference on planning and method for scientific research work on plant protection in the N.W. zone of the U.S.S.R., 25–29 November 1958. Summarized reports.]—207 pp., 1 graph, 1 map, Riga, Min. Agric., Latvian S.S.R., 1958. [Received June 1960.]

Among the 30 brief accounts of papers on fungal, bacterial, and virus diseases and their control (sect. IV–VI, pp. 99–154) are the following: B. Briede (Latvian sci.-Res. Inst. Agric.) listed the diseases of strawberry (p. 100), viz. brown spot (*Marssonina potentillae*) [? *Diplocarpon earliana*], white spot (*Ramularia tulasnei*) [*Mycosphaerella fragariae*], grey mould (*Botrytis cinerea*) [cf. **39**, 31], powdery mildew (*Sphaerotheca macularis*) [*S.* ? *humuli*], and black rot (*Rhizopus nigricans*) [*R. stolonifer*].

The same author (pp. 101–102) discussed biological and chemical control of club root of cabbage [*Plasmodiophora brassicae*]: treatment of the roots of seedlings before planting with phosphorobacterin [cf. **38**, 233] reduced the number of heavily infected plants from 30 (control) to 7% and gave 44% increase in yield; borax (1 g./100 kg. organic mixture) from 74 to 40–45% (77% increased yield); and seed treatment with 0·05% borax solution from 67 to 41% (20% increased yield). Root treatment with trichodermin [**39**, 1] gave 0–20% increased yield, and seed treatment with 0·01% boric acid, 10%.

I. Ya. Zherbele (Baltic Sta. Plant Prot.; p. 105) noted some features of *Ascochyta* spp. under Baltic conditions, including the possibility of infection of vetch and clover by *A. phaseolorum* and of beet by *A. chenopodii*.

K. Ya. Kalashnikov (Pushkin sci.-Res. Foundation All-Union sci.-Res. Inst. Plant Prot.; pp. 110–111) supplied some data concerning the control of winter and summer wheat bunt [*Tilletia caries*] and stripe smut of rye [*Urocystis occulta*: **36**, 460] with methylmercurichloride, modifications of mercuran (ethylmercurichloride and ethylmercuriphosphate+gamma isomere [?BHC]), 40% hexachlorbenzene, 50% thiram (the last 2 named both single and combined with an insecticide), 50% Zn salt [unspecified], phygon, granosan [cf. **38**, 401], etc.

Mme E. F. Karaseva, T. S. Efremenko, & Mme G. I. Nilova (Lithuanian Colorado Beetle, Nematodes, and Potato Wart exp. Sta.) noted (pp. 114–115) relationships between the incidence of potato wart [*Synchytrium endobioticum*: **39**, 489], rainfall, and soil temp., e.g. the highest incidence in susceptible vars., 98·7%, occurred in 1957 with 276 mm. rainfall and 18° [C.], the second highest (98·4%) in 1954 with 465 mm. and 15°. Periodical watering of soil up to 70 and 90% moisture capacity reduced incidence from 53 to 38 and to 17%, respectively. Sporangia from the highly susceptible vars. Vale and Al'ma germinated poorly (0–16%) *in vitro* during the 1st fortnight and well (39–65%) during the 2nd, those from the less susceptible vars. Varba, Vol'tman, and Deodara were the opposite (37–43 and 11–25).

Mme V. D. Kupriyanova (Pushkin sci-Res. Foundation) (p. 117) reported on the diseases of clover in the Leningrad, Pskov, and Vologod areas, which were caused by *Botrytis* (4% incidence), *Fusarium* (4%), *Macrosporium* (5%), *Gloeosporium* (1%), and other gen. (2%). The best control was obtained from granosan at 1·5 and 2 g./kg., thiram 3 g./kg., thiram+gamma-isomere GKhTsG at 2 and 3 g./kg., and thiram+heptachlor and mercuran at 2 and 2·5 g./kg.

Mme R. I. Mikheeva (Baltic Sta. Plant Prot.; pp. 122–123) showed that sugar-beet seed plants infected with *Peronospora schachtii* were a source of inoculum for adjacent seedling stands, incidence being 55% at 10 m. distance, 26·3% at 50 m.,

20·1% at 100 m., 7·7% at 300 m., and 0·8% at 2·5 km. in seedlings from seed treated with granosan. Opt. temp. for infection was 14·6° [C.], for germination 14–16°, and the shortest incubation period was 5–6 days. On seed plants 2 sprays with 0·5% zineb ensured 100% control and increased yield by 122·2% over that of untreated plants.

The biology and host range in Estonia of spp. of *Mastigosporium*, causing white spot of perennial grasses, was outlined by Ya. Sarv (Jõgeva Selection Sta.; pp. 128–129). In the greenhouse inoculations of *Alopecurus pratensis*, the natural host, with *M. album* and of *Dactylis glomerata* with *M. calcum* [*M. rubricosum*] were successful, the former resulting in 50% reduction of green matter, but only sporadic infection by *M. album* developed on *Arrhenatherum elatior* and *Bromus inermis*; *M. album* spores, plentiful in rain water falling from the grasses, were found in the air only in their immediate neighbourhood, and there was no infection of healthy plants at 5 m. from the diseased.

V. V. Upitis (Latvian sci.-Res. Inst. Agric.) reported (pp. 130–131) on a successful use of culture filtrates of various strs. of *Trichoderma*, *Trichothecium*, *Penicillium*, *Aspergillus*, *Chaetomium*, *Alternaria*, *Fusarium*, and other spp. against rose mildew (*Sphaerotheca pannosa*) [cf. **39**, 87]: in Riga spraying roses with yeast (*Saccharomyces cerevisiae*) filtrate +0·2% liquid soap solution reduced the disease by 60–80%.

Mme A. P. Khar'kova & I. M. Rudenko (Polar exp. Sta. All-Union Inst. Plant Breeding) dealt (pp. 134–135) with *Oospora pustulans* infection of potato tubers in the Murmansk area [**39**, 492]: resistance was increased by dressings of P, lime (250 kg. ha.), shale ash (250 kg. ha.), B (35 kg. ha.), Mg (70 kg. ha.), or Cu (4 kg. ha.).

N. N. D'yachenko (All-Union sci.-Res. Inst. Plant Prot.), reviewing virus diseases of tomato (pp. 141–142), emphasized the importance of hybridization for the development of resistant vars., and of serological tests for the discovery of infection during the latent stage, and noted, *inter alia*, control by wetting seed in a solution of phosphoro-potassium salts with B and Mn supplements and by heating seed to inactivate the virus.

K. G. Titov (N.W. sci.-Res. Inst. Agric.) noted (pp. 149–150) the summer wheat vars. LGS 12 and GLS 133 as highly resistant to both bunt [*Tilletia caries*; cf. **38**, 686] and loose smut [*Ustilago nuda*] and winter wheat var. Suidinskaya and hybrid 15 h 1429 as highly resistant to bunt, further pea vars. and hybrids Snezhinka, Iz (Snezhinka × Ambroziya), H 291 (Snezhinka × Victoria L'vovskaya), and Severyanin as resistant to ascochytosis [*Ascochyta pisi*], spring vetch vars. Paritskaya and Pushkinskaya as more resistant to bacteriosis [unspecified] than L'govskaya, and potato hybrids 718 24, 369 3, 526 6, and 710 19 as resistant or mildly susceptible to black leg [*Erwinia phytophthora*].

Report of the Department of Scientific and Industrial Research, New Zealand, for the year ended 31 March 1960.—128 pp., 1960.

In this report [cf. **39**, 80] it is noted that 2 new hop vars., First Choice and Calycross, resistant to root rot (*Phytophthora* sp.) [cf. **36**, 211], are to be released.

Pea leaf roll virus, a disease previously recorded only from Europe [cf. **38**, 554], has been found to be widespread and to cause severe losses in legume crops in N.Z. Greenfeast, Massey, and Victory Freezer peas were resistant, while Onward and Dark Skinned Perfection were susceptible. Broad bean crops at Christchurch and Hastings were 100% infected, the yield being severely reduced.

E. E. Chamberlain (pp. 90–95) summarizes the activities of the Plant Diseases Div. and lists its publications.

Hopkins (J. C. F.). **Plant diseases in the British Colonial Dependencies.**—*F.A.O. Plant Prot. Bull.*, **8**, 9, p. 109, 1960.

In Kenya I. A. S. Gibson & N. A. Goodchild have found that *Armillaria mellea*

[**37**, 512; **39**, 228], causing tea root rot, is not spread by air-borne spores, and that control by ring-barking [**16**, 564] is effective. There is an association between *A. mellea* and the roots of healthy tea and indigenous trees, the fungus becoming parasitic only when the natural balance is disturbed.

New disease records for Mauritius include *Mycosphaerella musicola* [map 7] and *Cordana musae* [168] on banana, *Pseudoperonospora cubensis* on cucumber, *M. arachidicola* [166] on groundnut, and *Cercospora canescens* on *Phaseolus*.

B. E. J. Wheeler has shown that wither tip of limes [*Gloeosporium limetticola*: **37**, 71] in Zanzibar may be controlled by phenyl mercury nitrate. Captan was effective but too expensive and 7 other fungicides ineffective: the possibility of toxic residues is being studied.

Cushion gall of cacao [cf. **39**, 223] has been reported from British Honduras.

The pepper var. grown in Sarawak [**39**, 482] has been shown by P. Holliday to be very susceptible to *Phytophthora* sp. [**36**, 498] causing foot rot. Cultivars from Indonesia are resistant and those from India intermediate in reaction. Young and mature plants are equally susceptible but spread of the disease has been checked by cuprous oxide drenches.

Cercospora fuliginea [382], causing a brown mould on tomato leaves, is newly recorded from the British Solomon Islands [**39**, 536].

Outbreaks and new records. —*F.A.O. Plant Prot. Bull.* **8**, 9, pp. 113–114, 1960.

J. B. Goldberg & A. von der Pahlen (Inst. de Fitotecnia, Castelar) note 2 new pea diseases in Argentina; *Pseudomonas pisi* [map 253] appeared in Buenos Aires in Oct. 1958, affecting 30% of the aerial parts of dwarf peas, but only 5–10% of climbing peas; *Septoria pisi* caused light attacks of blotch in 1958 on the var. Holandesa and in the following year up to 30% of the surface of the plants was covered with lesions.

From the Directorate of Plant Protection, New Delhi, D. B. Reddy records heavy incidence of *Dilophospora alopecuri* [cf. **37**, 415] on wheat in Apr. 1959 in the Kashmir valley, but the disease is of little economic importance.

Hawker (Lilian E.), Linton (A. H.), Folkes (B. F.), & Carlile (M. J.). **An introduction to the biology of micro-organisms.**—vii—452 pp., 40 pl., 31 fig., 30 graphs, London, Edward Arnold (Publishers) Ltd., 1960. 35*s*.

Sect. I of this well-produced book intended for university students covers the morphology and life cycles of micro-organisms, including chapt. on bacteria, fungi, and viruses. Sect. II covers physiology and metabolism, with separate chapt. on chemistry; metabolism; nutrition; growth; phase changes, differentiation, and reproduction; and survival, dormancy, senescence, and death. Sect. III, on the ecology of micro-organisms, covers the microbiology of soil, air and water; micro-organisms and plants and animals; the microbiology of food and other commercial products; and industrial fermentations.

There is an appendix on techniques and a subject index and each chapt. has a bibliography.

Rey (L.) [Ed.]. **Traité de lyophilisation.** [A treatise on lyophilization.]—vii+411 pp., 45 graphs, 186 fig., Paris, Hermann, 1960. 90 N.F.

Rey (L.). **Conservation de la vie par le froid.** [Preservation of life by refrigeration.] —167 pp., 35 graphs, 65 fig., Paris, Hermann, 1959. 27 N.F.

The 1st of these books comprises a number of review articles by Rey and others. R. I. M. Greaves (pp. 207–218) discusses his experience with various protective agents in the freeze-drying of bacteria, with particular reference to distilled water, glucose at various concentrations, culture broths+glucose, culture

broths – glucose – serum, and sodium glutamate. P. Goret (pp. 239–250) covers the application of freeze-drying to the conservation of bacterial and virus products used in veterinary medicine.

The 2nd book is concerned largely with a detailed practical and theoretical study of the apparatus used in this process.

Robbs (C. F.). **Bacterias fitopatogênicas no Brasil.** [Phytopathogenic bacteria in Brazil.] [*Publ.*] *Inst. Econ. rural. Rio de J.*, Sér. Divulg. Pesq., 2, 63 pp., 6 pl., 1960. [Engl. summ. (3½ pp.).]

This is a series of 11 papers concerning bacterial plant pathogens of Brazil [cf. **35**, 752]. A description is given of a new and very destructive disease of tobacco in the Minas Gerais area caused by *Pseudomonas cichorii*, which also produced infections on lettuce [**34**, 507], endive, cabbage, cauliflower, string bean [*Phaseolus vulgaris*], tomato, and cucumber, but not on lemon. *P. cichorii* is very common in Brazil, on a wide range of hosts [cf. **14**, 738; **35**, 859].

Information on a disease of black pepper (*Piper nigrum*) caused by *Pseudomonas syringae* has been noticed [**39**, 332].

As the result of a comparative study, 11 *Pseudomonas* spp. are divided into 3 groups, the 1st comprising *P. tabaci* [map 293], *P. syringae*, *P. carica-papayae*, *P. cichorii*, *P. mori*, and *P. glycinea*, which grow in Clara's medium [**14**, 16] and produce green fluorescent pigment [cf. **39**, 213]; the 2nd including *P. solanacearum*, *P. garcae*, *P. ricini*, and *P. sacastanoi* [**34**, 466], also growing in Clara's medium but without producing green fluorescent pigment; and lastly *P. mangifera-indicae* alone, which does not grow in Clara's medium and, according to the author, should be included in *Xanthomonas*.

Black leg occurred on potatoes in 5 States. Isolates from them were placed in 2 spp., *Erwinia carotocorum* [*E. carotovora*] and *E. phytophthorum* [*E. phytophthora*; cf. **39**, 659]; both caused black leg symptoms and tuber rots, with the production of melanin, a result contrasting with that of Burkholder & Smith [**29**, 276].

Strains of *Xanthomonas vesicatoria* from bacterial spot of tomato infected pepper [*Capsicum*] and cabbage and are apparently *X. c.* var. *raphani* [**21**, 52]. Streptomycin at 200 p.p.m. at weekly intervals gave good control of the pathogen on pepper [*Capsicum*], of *X. dieffenbachiae* on anthurium, and *X. begoniae* on begonia.

A 3-yr. rotation with other crops on a muck soil (pH ca. 4) to control bacterial wilt (*Pseudomonas solanacearum*) of tomatoes showed that disease incidence after rice was reduced from 41·52% to 3·7–6·2%. To control bacterial canker of tomatoes (*Corynebacterium michiganense*) [map 26] infected seeds were effectively treated by soaking in 400 p.p.m. streptomycin for 30 min. (1 l. solution/100 g. seed) and drying without washing. Seedlings were best protected in infected soil by spraying with 200 p.p.m. streptomycin 24 hr. before transplanting, or in lightly infected soils by watering with streptomycin at a min. of 20 ml./plant 3–4 hr. before transplanting.

Friedman (B. A.). **Status of synonomy and plant pathogenicity of Pseudomonas marginalis and P. aeruginosa.**—*Int. Bull. bact. Nom. Taxon.*, **10**, 3, pp. 197–204, 1960. [41 ref.]

From a survey of the literature it is suggested that *P. marginalis* is the correct name of a distinct sp. and is not a synonym of *P. aeruginosa* [cf. **39**, 271]. *P. marginalis* can be differentiated from the latter by the fact that it does not form pyocyanin, grows not at all or only feebly at 37–39° C., produces pectolytic enzymes in culture, ferments pectic substances, and is a virulent pathogen on a number of plant hosts. The role of *P. aeruginosa* as a plant pathogen [**22**, 377] is considered doubtful at present. The status of *P. polycolor*, originally described from tobacco [**10**, 133] and said to be synonymous with *P. aeruginosa*, is also doubtful.

QUADLING (C.). **Mutation conferring streptomycin resistance in Xanthomonas phaseoli.** —*Canad. J. Microbiol.*, **6**, 4, pp. 387–396, 1960. [25 ref.]

Experiments at the Canada Dept Agric., Ottawa, established that spontaneous mutations of *X. phaseoli*, resistant to 500–2,000 μg. ml. streptomycin, occur at the rate of about 3×10^{-10} bacterium/generation. Some of these mutants grow only if the drug is present. Resistance does not usually affect the pathogenicity of *X. phaseoli* to bean [*Phaseolus vulgaris*].

QUADLING (C.). **Preservation of Xanthomonas by freezing in glycerol broth.**—*Canad. J. Microbiol.*, **6**, 4, pp. 475–477, 1960. [12 ref.]

Colony counts were made to determine the survival after various periods at —20° C. of cultures of *X. phaseoli* in nutrient broth containing glycerol to a final conc. of 15% (v/v). The mutation rate to streptomycin tolerance [see above] was comparable to the rate in bacteria not subjected to cold storage. In addition, cultures of *Rhizobium*, *Erwinia*, and *Pseudomonas* were not affected in genetic stability, virulence, or lysogenicity by cold storage.

JONARD (R.). **Action de l'acide indol-acétique et de l'extrait de levures sur la restauration du pouvoir de prolifération de cultures de tissus de crown-gall de Scorsonère ayant été irradiées par les rayons X.** [Action of indole-acetic acid and yeast extract on the restoration of the capacity for proliferation of cultures of *Scorzonera* crown gall tissue irradiated by X-rays.]—*C. R. Acad. Sci., Paris*, **251**, 4, pp. 588–590, 1960.

Even at 5–10 p.p.m. indole-acetic acid, added to a mineral 5% glucose agar medium, failed to restore the proliferative capacity of cultures of *S.* [*hispanica*] tissues invaded by crown gall [*Agrobacterium tumefaciens*: see below] after exposure to 1,000 r X-rays [**38**, 566]. On the other hand, yeast extract (1:1,000) incited rapid recovery of the normal multiplicative ability of the bacterium.

KURODA (KIYOKO). **Phénomènes d'induction histogénétique provoqués par des tissus normaux et tumoraux.** [Phenomena of histogenetic induction promoted by normal and tumorous tissues.]—*C. R. Acad. Sci., Paris*, **251**, 4, pp. 585–587, 1 diag., 1960.

The grafting of fragments of normal tissue of *Scorzonera* [*hispanica*] on sections of the root xylem culminates in a junction of the newly formed generative zones of the scion and stock. A similar operation with crown-gall [*Agrobacterium tumefaciens*] tissues [cf. above] resulted in more intensive processes of neoformation, characterized by the production of cribro-vascular bundles.

ARMAN (P[AMELA]) & WAIN (R. L.). **Studies upon the copper fungicides. XI. Absorption of soluble copper in relation to stage of leaf growth and to leaf injury.**—*Ann. appl. Biol.*, **48**, 2, pp. 392–398, 3 graphs, 1960.

In further studies at Wye Coll., Ashford, Kent [**38**, 180], the absorption of Cu by young apple leaves was relatively high, possibly because of the numerous stomata and hairs. As the leaves matured absorption fell, rising again to a max. in July or Aug., then falling. That autumn leaves take up less Cu than younger ones demonstrates that changes in susceptibility to Cu sprays cannot be due solely to changes in the permeability of the leaf to soluble Cu, but must be at least partly due to some other factor, such as variations in the amount of Cu dissolved by leaf exudations or in the susceptibility of the tissues to Cu poisoning.

Older leaves probably bear a greater number of injuries than young leaves. That such leaves absorb less Cu than younger ones suggests that injuries are not an important route for Cu entry: experimental evidence supported this view. Spray damage can probably occur in the absence of injuries and it seems that only injuries

inflicted near the time of spraying have a significant effect on the amount of such damage.

PICKARD (J. A.) & MARTIN (J. T.). **Spray application problems : LX. The uptake of mercury by plant tissues.**—*Rep. agric. hort. Res. Sta. Bristol, 1959*, pp. 93–100, [1960].

Further studies [cf. **39**, 412] confirmed an earlier finding [**38**, 89; cf. **39**, 720] that Bramley apples are likely to contain about 0·05 p.p.m. Hg after normal commercial spraying for control of scab [*Venturia inaequalis*]. Absorption from the surfaces of apple leaves and fruits occurs within a few days: some Hg is firmly held in the cuticle and some appears in the flesh. Hg was taken up by the roots of dwarf bean [*Phaseolus vulgaris*] and lettuce plants growing in nutrient solutions and was translocated in small amounts to the tops. The curds of broccoli plants, which as seedlings had had their roots dipped in calomel or $HgCl_2$ before planting, contained no more Hg than those of untreated plants, but appreciable quantities were present in the roots and attached soil.

TAPSCOTT (ANN R.) & MAPOTHER (H. R.). **Spray application problems : LXII. The limits of visibility of fluorescent tracers in spray liquids.**—*Rep. agric. hort. Res. Sta. Bristol, 1959*, pp. 103–105, [1960].

In continuation of earlier work [**39**, 380] the authors examined the possibility that when tracers are used with low-volume spraying machines fluorescence may not be visible because of the small droplet size and the degree of dispersion, though the coverage may be adequate. Tables are given showing the number of fluorescent particles and wt. of Cu on apple leaves and the amount of Cu/100 fluorescent particles with 2 tracers, and also the limits of visibility on apple, strawberry, and broad bean leaves of 5 tracers applied at various concs. in sprays of various droplet sizes.

PHILLIPS (G. F.), DIXON (B. E.), & LIDZEY (R. G.). **The volatility of organo-mercury compounds.** *J. Sci. Fd Agric.*, **10**, 11, pp. 604–610, 2 diag., 1 graph, 1959.

At the Govt Lab., Clement's Inn Passage, London, the saturated vapour concs. at 35° C. of 21 organo-Hg compounds were determined by static and dynamic methods and the corresponding partial pressures derived. For 14 of the compounds, together with Hg and HgCl, values at 25° and 45° were also determined and the constants in the linear pressure-temp. relation calculated.

All the mercurials were shown to possess the general form R·Hg·X, where R = the C substituent and X the partially co-valent acidic radical. The influence of R on vapour pressure was clearly apparent in the Cl series but that of X was more complex. Thus, a factor of 150 separates the volatility of the 4 ethyl compounds compared with an increase of only 20-fold for the 10 phenyl Hg. The influence of X is independent of mol. wt. and not merely related to the electro-negativity of the radical.

Within the comparatively narrow temp. range of the observations, the vapour pressure curves of HgCl and the 4 aryl compounds examined by the dynamic method exhibited a steeper temp. gradient than Hg and the alkyl derivatives.

KIMURA (Y.) & MILLER (V. L.). **Vapor phase separation of methyl- or ethyl-mercury compounds and metallic mercury.** *Analyt. Chem.*, **32**, 3, pp. 420–424, 2 diag., 1960.

At the W. Washington Exp. Sta., Puyallup, Wash., a method was devised for the capture of Et- and MeHg compounds in the presence of Hg vapour [cf. above] in connexion with a study of organic Hg fungicide decomposition in soil. It is based

on the passage of the metallic Hg vapours through a solution of Na_2CO_3 and Na_2HPO_4 and its quantitative capture in acid $KMnO_4$ solution. By this means 10 μg. or more of the alkyl Hg compound can be trapped in 1 cu. m. air.

Scott (C. B.), Yale (J. W.), & Hashimoto (S.). **Preparation and fungitoxicity of some trialkyl phosphorotetrathioates.**—*J. agric. Fd Chem.*, **8**, 4, pp. 303–306, 1 graph, 1960.

At the Res. Dept, Union Oil Co. of Calif., Brea, Calif., homologous series of both symmetrical and asymmetrical trialkyl phosphorotetrathioates (16 in all) were prepared by methods already described (*J. org. Chem.*, **22**, p. 789, 1957) and tested on potato dextrose agar plates at 25° C. for toxicity to *Rhizoctonia* [*Corticium*] *solani*, *Sclerotium rolfsii*, *Phytophthora cinnamomi*, *Pythium ultimum*, *Sclerotinia sclerotiorum*, *Monilinia* [*S.*] *fructicola*, *Botrytis cinerea*, and *Alternaria solani*. Some of the shorter homologues, e.g. trimethyl phosphorotetrathioate, proved to be more active than the standard fungicides, phygon, captan, terrachlor, and ferbam, used for comparison. In general, the fungitoxicity of the test compounds decreased with lengthening of the alkyl groups.

Reinhart (J. H.). **A method of evaluating fungicides in the soil under controlled conditions.**—*Plant Dis. Reptr*, **44**, 8, pp. 648–652, 1 graph, 1960. [15 ref.]

A description is given of a test for potential soil fungicides developed at the Olin Mathieson Chemical Corp., Port Jefferson Sta., New York. *Fusarium oxysporum* f. *cucumerinum* is incubated for 10-14 days at 25° C. on sterilized oats in $\frac{1}{2}$ pint milk bottles, using 75 g. oats+53 ml. water/bottle and 1–2 infected grains of oats as inoculum. The chemical to be tested is formulated as a 10% dust, using pyrophyllite+synthetic Ca silicate as a diluent. In a test any conc. of the dust formulation is added to 3,000 g. air-dried steam-sterilized soil+60 ml. water+10 g. of the oat culture in an 8-quart Patterson-Kelley intensifier model shell blender, and the mixture blended for 3 min. Controls are similar portions of soil lacking the test chemical and with or without the *Fusarium* oat culture. From each batch of blended soil 660 g. are placed in each of 3 pint paper containers, pressed flat, and 15 Early Green Prolific cucumber seeds sown, then covered with 140 g. soil. The containers are kept under fluorescent lights at 80° F. for opt. development of wilt symptoms. The moisture content of the containers is maintained at 50% field capacity. The test is finished when the stand in the infected controls is reduced to 10–15%, after 15–20 days. The percentage kill attributable to the fungus is calculated by $\frac{A-B}{A} \times 100$, where A = % stand in uninfested controls and B = stand in treatment; and the % control by any chemical treatment is given by $\frac{C-D}{C} \times 100$, where C = % kill in infested control and D = % kill in chemical treatment. Dosage-response curves are constructed; the method is particularly valuable in comparing related compounds of similar fungitoxicities. The interpretation of the data is discussed and an example given of the use of the method.

Turner (G. O.). **Trizone, a new triple action soil fumigant.**—*Down to Earth*, **15**, 4, pp. 2–5, 6 fig., 1960.

Trizone, a fumigant for both fungus and nematode control manufactured by the Dow Chemical Co., is a mixture of 61% methyl bromide, 31% chloropicrin, and 8% propargyl bromide, to be used at 140–200 lb./acre for seedbeds, injected at a depth of 6 in. into well prepared soil with chisels on 12 in. centres and the treated area covered with a gas-tight tarpaulin. With soil at over 50° F. 2 days' covering has given excellent results, but with a lower temp. 3–4 days is desirable. Trizone

vapour toxicity is high and highly toxic orally, but its lachrymatory properties provide a measure of safety.

Dedolph (R. R.), Basham (C. W.), & Stark (F. C.). **An exponential sprayer for experimental work.**—*Proc. Amer. Soc. hort. Sci.*, **75**, pp. 785–788, 3 fig., 1 graph, 1960.

A description of the design and calibration of an experimental spraying machine, made at Univ. Md, College Park, which applies a constant vol. of spray while the conc. of the active ingredient is decreased exponentially [cf. **39**, 664]. The machine enables the effective range of concs. of fungicides, etc. to be determined.

Levin (R.). **Non-medical uses of antibiotics.** *Chem. Prod.*, **23**, 4, pp. 157–160, 1960.

A review is given of current experimental work on horticultural applications, especially of actidione and griseofulvin, which has been freed for sale to growers by the Advisory Committee on Poisonous Substances used in Agric. No special precautions are indicated for the protection of operators, while the treatment of lettuce against grey mould [*Botrytis cinerea*: **37**, 621] at 8 oz./acre, allowing a min. interval of 4 weeks between the last application and harvesting, should involve no risk to the consumer.

Rao (K. R.) & Thirumalachar (M. J.). **Studies on the control of root rots of some crop plants with nystatin.** *Hind. Antibiot. Bull.*, **3**, 1, pp. 24–27, 1960.

At the Inst. Sci., Bombay and Hindustan Antibiotics Ltd., Pimpri, Poona, India, seed treatment of cotton with nystatin (40–50 µg. 100 seeds) [**39**, 673] reduced the incidence of *Colletotrichum indicum* [**38**, 145] from 98% (untreated) to 19% (40 mg.) and 18% (50 mg.). Similar treatment against *Macrophomina phaseoli*, *Rhizoctonia* [*Corticium*] *solani*, and *Pythium aphanidermatum* (damping off *Capsicum annuum*) was unsatisfactory.

Gottlieb (D.), Carter (H. E.), Wu (L.-C.), & Sloneker (J. H.). **Inhibition of fungi by filipin and its antagonism by sterols.** *Phytopathology*, **50**, 8 (1), pp. 594–603, 9 fig., 1 diag., 3 graphs, 1960. [25 ref.]

This further report [cf. **38**, 130] from Univ. Ill., Mich. State Univ., and U.S.D.A., Peoria, Ill., includes a description of the morphological effect of filipin on yeast and on *Aspergillus flavus* and determination of the concs. inhibiting growth of 77 fungi. The range of protection by cholesterol against the antifungal effect of filipin and the antagonism of sterols to other polyenes are outlined. The chemistry of sterol structure as it relates to anti-filipin activity is described, together with other features of the sterol relationships and mode of action involved.

Staron (T.) & Faivre-Amiot (A.). **Isolement et propriétés physicochimiques d'un nouvel antibiotique antifongique.** [Isolation and physico-chemical properties of a new antifungal antibiotic.] *C. R. Acad. Sci., Paris*, **250**, 9, pp. 1730–1732, 1 graph, 1960.

AE 56, isolated from *Streptomyces* sp., is stated to possess a very wide spectrum of activity against fungi pathogenic to plants, animals, and man. The example chosen to illustrate its effects is *Endothia parasitica*, the growth of which was inhibited at 0·04 µg./ml. AE 56 is a yellowish powder, highly soluble in water and turning bright blue in conc. SO_2. It is very labile in aqueous solution, with a conservation period of only 2–3 days, is denatured rapidly by very dilute acids (0·01 N), and does not resist autoclaving. However, it can easily be maintained in a dry state at lab. temp. AE 56 was non-toxic to guinea-pigs.

Bolore (M.). **Un nouvel antibiotique actif contre certaines bactéries et champignons microscopiques.** [A new antibiotic active against certain microscopic bacteria and fungi.]—*C. R. Acad. Agric. Fr.*, **46**, 7, pp. 373–374, 1960.

Coccobacillus [*Mycoplasma*] *gaunicus*, isolated from a watercress bed, was found to inhibit all microbial growth in its vicinity, and to yield an antibiotic secretion. When potatoes, previously wounded, were inoculated with a suspension of *Fusarium* spores and placed in conditions most favourable to *F.* growth and were then exposed to the secretion, 60% of the wounds developed no growth of the fungus and in the remainder fungal invasion was limited to an av. depth of 7 mm. by the formation of a cork barrier.

When the work was repeated by J. W. Guthrie, Idaho Univ., of 381 wounds inoculated with *F. sambucinum* and *F. caeruleum* and treated for 3 min. with 10–50% solutions of the secretion, only 3 developed slight infection.

Eckert (J. W.) & Tsao (P. H.). **A preliminary report on the use of pimaricin in the isolation of Phytophthora spp. from root tissues.**—*Plant Dis. Reptr.* **44**, 8, pp. 660–661, 1960.

In preliminary tests at the Dept Plant Path., Univ. Calif., Riverside, pieces of citrus fibrous roots, suspected of *Phytophthora* infection, were surface-sterilized in 0·5% Na hypochlorite and plated on corn meal agar with or without 100 p.p.m. Na pimaricin [**38**, 463]+50 p.p.m. Na penicillin G (1,650 units mg.) +50 p.p.m. polymyxin B sulphate (7,760 units mg.). Recovery of *P. citrophthora* and *P. parasitica* was improved by the use of the antibiotics, the pimaricin preventing the growth of non-pythiaceous fungi and polymyxin and penicillin reducing bacterial contamination. The medium appears to show promise for isolating *P. cinnamomi* from avocado roots and *P. cryptogea* from lucerne roots.

Malivánková (Vlasta). **Some results of investigations on micro-organisms and their harmful effects in the paper industry.**—*Bull. Výsk. Úst. Pap. Celulózy*, **2**, 2, 18 pp., 1959. [Germ. *Bull. Inst. Pap. Chem.*, **30**, 11, p. 1400, 1960.]

At Bratislava, Czechoslovakia, a waste-paper stock, 2 chemical pulps (sulphite and sulphate), and 2 mechanical pulps (steamed or brown and plain or white groundwood) were examined for micro-organisms at various stages of the paper-making process. The waste-paper stock yielded the max. numbers and variety; a relatively high proportion of the [unspecified] mould population survived drying. The addition of 0·25% Ca $(OCl)_2$ to the hollander is recommended for the control of micro-organisms and off-odours in the finished product. The alkaline reaction of kraft pulp discourages the development of fungus spores while favouring bacterial growth. Bacteria were more abundant than fungi in sulphite pulp, except in insufficiently washed samples, the acid reaction of which promoted the development of the fungi. Pre-steaming of wood was found to reduce microbial activity, but the subsequent grinding should not be long delayed. Brown mechanical pulp contained fewer micro-organisms than white, but prolonged storage of the steamed wood gave rise to a larger population than that of waste-paper stock. Mechanical pulp in storage should be sprayed with a fungicide, e.g. 2% pentachlorophenol or 0·02% organic Hg compound. In various pulp mills effective slime control was achieved by a 3-stage method comprising thorough chemical or mechanical cleansing of the machine and conduit system, disinfection with an Hg solution, and chlorination of the process water.

Scheuring (L.), Zehender (C.), Wittenberger (K.), & Kirsammer (R.). **Untersuchungen über das Wachstum von Fusarium aquaeductum Lagh. auf den Abwässern der Sulfit-Zellstoff-Industrie.** [Investigations in the growth of *F.*

aquaeductum on the waste waters of the sulphite pulp industry.]—*Papier*, **14**, 1, pp. 1–5, 1960. [Engl., Fr. summ.]

In flask cultures and flow-through apparatus at the Werkslabor der Schwäbischen Zellstoff-AG Ehingen, Germany, *F. aquaeductum* [**38**, 184] grew at very high and very low cones. of beech and spruce waste liquor, yeast and spirit vinasse, and beech steam condensate. The opt. pH for development lies between 5 and 6. The N and phosphate contents of the waste and incoming waters appear to provide sufficient nutriment.

Nyuksha (Mme Y. P.). Изменение химических и механических свойств бумаги при её поражении грибом **Gymnoascus setosus.** [Changes in the chemical and mechanical qualities of paper contaminated by *G. setosus*.]—*Microbiology, Moscow*, **29**, 2, pp. 276–280, 3 fig., 1960. [Engl. summ.]

At the M.E. Saltykov-Shchedrin State Public Library, Leningrad, tests on filter paper prepared from wood, cotton, and flax cellulose showed that decomposition of the fibres by *G. setosus* [**39**, 547] ranged from insignificant chemical and morphological changes to complete disintegration. Chemical methods revealed fine changes in the fibres, but mechanical tests were too rough and only yielded occasional results. In affected paper there was a great increase in the percentage of carboxyl groups, the Cu no., and alkali solubility of cellulose, and a decrease in the degree of polymerization. Mechanical properties were greatly impaired, especially as regards bursting strength and breaking length. Both small and large fibres were affected, the latter being appreciably shortened. About 20% of the initial cellulose, including the α-cellulose, was completely destroyed within 2 months.

Kuplet'skaya (Mme M. B.), Kuznetsova (Mme V. M.), & Zhukova (Mme S. V.). Микробиологическая мацерация листьев Эвкоммии. III Разрушение гутты и смол в процессе сбраживания листьев. [Microbiological maceration of *Eucommia* leaves. III. Decomposition of gutta-percha and resins during leaf fermentation.] *Microbiology, Moscow*, **29**, 2, pp. 259–265, 1960. [Engl. summ.]

It was shown at the Biol. Soils Dept. M.V. Lomonosov Moscow State Univ., that during the fermentation of *Eucommia* leaves, used to produce gutta-percha, the decomposition of the latex takes place only under aerobic conditions by spp. of *Actinomyces* [*Streptomyces*], *Penicillium*, and *Chaetomium*. Resin is broken down aerobically by spp. of the same genera and of *Aspergillus* and *Trichoderma*, as well as by *Pseudomonas* spp. Denitrifying *P.* spp. can decompose the resins in anaerobic conditions.

Ablakatova (Mme A. A.). Грибные болезни Лимонника и Актинидии в Приморском крае. [Fungal diseases of *Schizandra* and *Actinidia* in the Primorskiĭ kraĭ.] *Mater. Izuch. Zhen'shenya Limonnika* 4, pp. 184–190, 1960.

The fruit of *Schizandra chinensis* is used in the food industry and that of *Actinidia*, especially *A. kolomikta*, has a very high vitamin C content. The author presents a brief survey of parasitic and saprophytic fungi collected in the Slavyanskiĭ district, Primor'e, at the Mountain-taiga Sta., Far Eastern Branch, Siberia, in the Suputinskiĭ reserve and in other districts of Primor'e. On *S. chinensis* 14 spp. of fungi were noted, of which the most serious were *Phyllosticta chinensis*, *Ascochyta zonata*, *Microsphaera schizandrae*, *Ramularia schizandrae*, and, frequently on seedlings, *Pythium debaryanum* and *Fusarium sporotrichioides* f. *schizandrae*. On *Actinidia* 15 spp. were noted. Of these *Phyllosticta actinidiae* appears to be new to science and is described [without a Latin diagnosis]. First records for the U.S.S.R. were *Colletotrichum actinidiae* and *Cytospora actinidiae*. The most serious

fungal diseases were *P. actinidiae*, *Phyllactinia suffulata* f. *actinidiae*, and *Discosia artocreas*.

GARBER (K.). **Neue Literatur über Rauch-, Staub- und Abgasschäden.** [New literature on smoke, dust, and waste-gas damage.]—*Angew. Bot.*, **34**. 2. pp. 65–103, 1960. [331 ref.]

A survey from the world literature of the effect on plants of SO_2, F, Cl, H_2S, NO_2, and NH_3, smog, cement and coal ash dust, and radioactive pollution of the air.

Sonderheft Rauchschaden. [Smoke damage supplement.]—*Forst u. Holz*, **15**. 13. pp. 245–264, 7 fig., 4 graphs, 4 maps, 1960.

Comprises papers embodying up-to-date information on the effect of dust and soot on the incremental growth of spruce by E. ROHMEDER (Munich, Germany) [cf. **34**. 7. and above]; the new emission law in the Federal [German] Republic by K. F. WENTZEL (Bochum); prevention of smoke damage in the forest through silvicultural measures in an industrial region at the foot of the Erzgebirge by E. ZIEGER; new observations on the 'turbidity test' (*Arch. Forstw.*, **7**. [pp. 750–759], 1959), especially its applicability to the continuous check on waste gases, by O. HARTEL (Graz, Austria); and silvicultural measures for the exploration and prevention of forest smoke damage in the Czech section of the Erzgebirge by J. MATERNA (Zbraslav, Strnady, ČSR) [**38**, 492].

LAMPADIUS (F.). **Beiträge zur Fluorschadendiagnostik. II. Ermittlung fluorhaltiger Immissionen durch Nachweis der Speicherung von Fluor in der Baumrinde.** [Contributions to the diagnosis of fluorine damage. II. Estimation of fluorine-containing discharges by demonstration of the storage of fluorine in the cortex of trees.]—*Phytopath. Z.*, **38**. 4. pp. 384–393, 1960. [Engl. summ.]

Further results in this series [cf. **40**. 22] from the Inst. für Forstnutzung und Forstschutz Tharandt, Dresden, Germany, show that a direct relationship exists.

Plant quarantine announcements.—*F.A.O. Plant Prot. Bull.*, **8**. 6. pp. 72–74; 7. pp. 87–88; 8. pp. 102–103; 9. p. 115, 1960.

CZECHOSLOVAKIA. Government Decree No. 1 of 9 Jan. 1959 (*Sbírka zákonů* 1, 2 Feb., 1959), regulating the import, transport, and export of plant material supersedes Decree No. 8 1951.

NEW ZEALAND. Plant Quarantine Regulations 1957, Amendment No. 1 (*Gazette*, 17 Dec. 1959), forbids the import of *Fagus* spp. but permits the import of *Ulmus* and *Zelkova* seed from N. America and Europe.

SPAIN. The phytosanitary and quality requirements of imported seed potatoes are laid down by Minist. Agric. Order of 15 Oct. 1959 (*Bol. ofic. Estado*, 21 Oct., 1959).

BELGIUM. Measures for preventing the introduction of *Verticillium albo-atrum* of hops are announced by Royal Decree of 7 Oct., 1959 (*Monit. Belge*, **129**. 268. 24 Oct., 1959).

CHILE. Decree No. 694 of 31 Aug. 1959 (*Diario ofic.* 24,455. 30 Sept., 1959) revokes Decree No. 482 of 10 July, 1956 and amends No. 622 of 15 May, 1950 regarding the import of flower bulbs. Decree No. 866 of 17 Nov. 1959 (*Diario ofic.* 24,499. 21 Nov., 1960) revokes No. 648 of 18 Aug. 1959 and amends No. 622 concerning the import of potatoes.

MEXICO. Executive Decree of 31 July 1959 (*Diario ofic.*, **235**. 34. 8 Aug., 1959) amends Exterior Quarantine No. 9 of 13 Sept. 1928, regarding the prohibition of the import of sugarcane cuttings, to cover exclusion of *Ustilago scitaminea*.

FEDERATION OF RHODESIA AND NYASALAND. Modifications to the previous regulations [**38**, 570] are introduced by Plant Pests and Diseases (Importation)

(Amendment) Regulations 1959, No. 1 (*Fed. Govt Gaz. Suppl.*, 16 Oct. 1959). Further points of entry listed are Fort Jameson and Mohambo of Northern Rhodesia and Detza and Mabosa of Nyasaland. The importation of coffee seed requires a permit. Citrus fruits may be imported from areas where *Guignardia citricarpa* and *Xanthomonas citri* are absent.

Bibliography of reviews 1949–1959. *Phytopathology*, **50**, 8 (2), 116 pp., 1960.

In this annotated phytopathological bibliography are included titles from journals devoted exclusively to review articles, miscellaneous papers with extensive citation lists and commentaries on published research, and Ph.D. theses with surveys of previous work on the same topic. The titles are arranged in alphabetical order of authors under sections (further subdivided) titled general considerations (pp. 9–15), causal factors (pp. 16–28), host plants (pp. 29–37), host-pathogen interaction (pp. 38–52), disease in populations (pp. 53–62), disease categories (pp. 63–83), and disease control (pp. 84–108). An appendix gives the full titles of the periodicals (abbreviated in the bibliography), together with their numbers in the catalogue of the U.S.D.A. Library, Washington, D.C.

Edwards (B. A. B.) & Janes (B. S.). **Plant protection.**—*J. Aust. Inst. agric. Sci.*, **26**, 2, pp. 190–198, 1960.

In this Jubilee issue the authors briefly review advances in plant protection work that have taken place in Australia since 1935, the subjects dealt with including the timing of fungicidal sprays, biological control, air-borne diseases, the soil with reference to disease, plant viruses, storage and transport problems, and the organization of plant protection.

Frey (D.) & Durie (E. B.). **The incidence of air-borne fungus in Sydney.**—*Mycopathologia*, **13**, 2, pp. 93–99, 2 graphs, 1960. [Germ. summ. 11 ref.]

In a survey carried out in Sydney, Australia [cf. **35**, 112], 1 Mar. 1958–28 Feb. 1959, Petri plates of Sabouraud's medium were exposed for 10 min. daily at 3 p.m. for 5 days a week from the 7th floor: 3,893 colonies were counted, 51·9% of which were *Cladosporium*, *Alternaria*, and *Epicoccum*. *Cladosporium* was the fungus most frequently collected over the whole period, forming 19·2% of all colonies. From Mar.–Oct. *Cladosporium* was predominant, *Alternaria* 2nd, and *Epicoccum* 3rd in frequency: *Alternaria* was the most common in Jan.–Feb., and *Epicoccum* in Nov.–Dec. Differences in prevalence corresponded roughly with differences in temp., R.H., and rainfall. No clear correlation could be established between colony counts and wind direction and velocity.

Persidsky (D. J.) & Wilde (S. A.). **The effect of biocides on the survival of mycorrhizal fungi.** *J. For.*, **58**, 7, pp. 522–524, 2 fig., 1960. [10 ref.]

In the Soils Dept. Univ. Wis., Madison, forest soil containing mycorrhizal fungi treated with different rates of chlordane, thiosan, and allyl alcohol was used to inoculate mycorrhiza-free prairie soil, which was subsequently sown with Monterey pine. Heavy doses completely killed mycorrhizal fungi, while light applications depressed the growth-promoting efficiency of mycorrhizal soils by 50%. Recommended measures for restoring the fertility of biocide-treated nursery soils include the addition of peat and other buffering materials, deep ploughing, and use of leaf mould and liquid humates.

Subramanian (C. V.). **Physiology of disease in plants.**—*J. Madras Univ.*, Sect. B, **29**, 1, pp. 9–44, 1959. [96 ref. Received Sept. 1960.]

The substance of the Dr. Todla Ekamberam Endowment Lectures, on the physiology of infection and symptom pictures in relation to host physiology, given at Univ. Madras, Oct. 1958.

Hirata (S.). **Studies on the phytohormone in the malformed portion of the diseased plants. 9. Metabolic production of indole-acetic acid in the culture of Taphrina deformans and 3 species of fungi causing witches'-broom. 10. Indole-acetic acid production of five species of bacteria causing gall, canker, or scab.**—*Bull. Fac. Agric. Univ. Miyazaki*, **5**, 2, pp. 77–84, 5 graphs; pp. 85–92, 5 graphs, 1960. [Jap. Abs. from Engl. summ.]

In further studies [**39**, 217] *T. cerasi*, *Exobasidium pentasporium*, *Ustilago shiraiana*, and *T. deformans* produced considerable quantities of I.A.A. but no other growth substances in Czapek's liquid medium containing L-tryptophane at 26° C.

On the same medium *Agrobacterium tumefaciens* from flowering cherry, *Erwinia milletiae* from *Wistaria floribunda*, *Pseudomonas eriobotryae* from loquat, *Xanthomonas citri* from Satsuma orange, and *Streptomyces scabies* from potato also produced I.A.A., *P. eriobotryae* forming the most. Hypertrophy of the host tissues by these bacteria seems in part to arise from their stimulation of I.A.A. production.

Misra (A. P.) & Mahmood (M.). **Effect of carbon and nitrogen nutrition on growth and sporulation of Colletotrichum capsici (Syd.) Butler and Bisby.** *J. Indian bot. Soc.*, **39**, 2, pp. 314–321, 1960.

In further work [**39**, 278] at Bihar agric. Coll., Sabour, lactose and xylose (C 2·5%) were the most suitable carbohydrates for growth and sporulation [cf. **36**, 445]. Asparagine was one of the best N sources (at 0·2% N). Peptone gave max. sporulation. A C/N ratio of 4/1 gave max. growth and sporulation.

Wakimoto (S.), Ikari (H.), & Yoshii (H.). **Relation between polyphenols contained in plants and phytopathogenic fungi. IV. Effect of some phenolic compounds on the growth of Piricularia oryzae and Cochliobolus miyabeanus. V. On the decomposition and utilization of some flavonoids by Piricularia oryzae and Cochliobolus miyabeanus.**—*Sci. Bull. Fac. Agric. Kyushu*, **17**, 4, pp. 383–393, 7 graphs; pp. 395–402, 1 fig., 4 graphs, 1960. [Jap. Abs. from Engl. summ.]

The 1st contribution [cf. **38**, 142] reports that mycelial growth of *C. miyabeanus* on Tomizawa's medium was promoted by rutin, phloroglucinol, and protocatechuic acid, all at 10^{-3} M. *C. miyabeanus* degraded phenolic compounds and in the presence of catechol (10^{-3} M) utilized the following C sources in descending order: sucrose, maltose, glucose, xylose, fructose, arabinose, and rhamnose. The browning of the culture fluid varied according to the phenol and the sugar used. Mycelial growth of *P. oryzae* was almost completely inhibited by catechol, caffeic acid, and gallic acid, all at 10^{-3} M, but unaffected by the same conc. of phloroglucinol, protocatechuic acid, or rutin. Media containing rutin, protocatechuic acid, catechol, or caffeic acid at 10^{-3} M were turned brown by *P. oryzae*. Both fungi discoloured the medium after 5–15 days' inoculation.

The 2nd reports similar experiments with the flavonoids: rutin at 10^{-3} M promoted growth of *C. miyabeanus* only and quercetin inhibited *P. oryzae* only. Media containing rutin were turned very brown by both fungi but only *C. miyabeanus* browned the quercetin medium. *P. oryzae* decomposed both rutin (10^{-3} M) and quercetin (10^{-4} M) to protocatechuic acid and phloroglucinol, but these products were not detected in cultures of *C. miyabeanus*, possibly owing to their rapid absorption by the fungus.

Tulloch (A. P.) & Ledingham (G. A.). **The component fatty acids of oils found in spores of plant rusts and other fungi.**—*Canad. J. Microbiol.*, **6**, 4, pp. 425–434, 1960. [14 ref.]

Further work at the Prairie Regional Lab., Saskatoon [cf. **39**, 467], demonstrated that *cis*-9, 10-epoxyoctadecanoic acid was present in the spore oil of 10 rust spp.,

though not in 3 others. The principal saturated acid in the fats was palmitic acid, unsaturated C_{18} acids generally comprising the remainder. Palmitic was not present in conidia of 2 powdery mildews. Fatty acids in rust spp. of a genus with hosts in the same plant family were similar, but where the hosts were in other families the fatty acid pattern varied. The fats of 5 spp. smuts and powdery mildews differed entirely from those in rusts.

Potatosova (Mme E. G.). Условия прорастания склероциев у грибов рода Тифула. [Conditions of germination of the sclerotia of the fungi of the genus *Typhula*.] Защ. Раст., Москва [*Zashch. Rast., Moskva*], **5**, 7, p. 40, 1960.

The collection of *T.* spp. from various parts of U.S.S.R. included *T. itoana* [cf. **38**, 590] found on winter wheat, rye, and other cereals and grasses, clover, vetch stalks, willow [*Salix* sp.] leaves, and maize; *T. idahoensis* [loc. cit.] on winter wheat, rye, timothy grass [*Phleum pratense*], lucerne, birdsfoot trefoil [*Lotus* sp.], pine seedlings, tumbling mustard [*Sisymbrium* sp.], and others; *T. variabilis* on potato, cabbage, turnip, sugarbeet, maize, field and Canadian thistle [*Cirsium* spp.], larch, and others; and *T. trifolii* on clover, moss, and others. Their sclerotia were sterilized with 1% $KMnO_4$ and kept in pots with sterilized sand damped up to 80% moisture capacity under glass. Germination under natural conditions of the sclerotia of *T. variabilis* and *T. trifolii* took place from the end of May to Dec. at 8–15·5° [C.], of *T. itoana* in Sept.–Oct. at 1·4–13·5°, and of *T. idahoensis* mainly in Oct. at 1·4–4·6°, in all cases best of all 5 mm. under the surface of the substrate in the lab. and 5–7 mm. in nature. Deeper than 10 mm. no sclerotia germinated, a fact which suggests the importance of tilling for control. Bedi's method [**36**, 610] was used to produce fruit bodies, which developed sporadically within 12 and generally within 22 days. Those of *T. variabilis* and *T. trifolii* bore spores, but were sterile in other spp.

Girbardt (M.). **Licht- und elektronenoptische Untersuchungen an Polystictus versicolor (L.). I. Der Wassergehalt des Hyaloplasmas vegetativer Zellen.** [Light- and electron-optical investigations on *P. versicolor*. I. The water content of the hyaloplasm of vegetative cells.] *Ber. dtsch. bot. Ges.*, **73**, 6, pp. 227–240, 4 pl. (31 fig.), 2 graphs, 1960.

In further work [**35**, 408] at Inst. für Mikrobiol. exp. Therapie, Jena, a modification of Barer's immersion refractometry technique (*J. opt. Soc. Amer.*, **47**, pp. 546–556, 1957) permitted the determination of the water content of the hyaloplasm of living cells of *P. versicolor* on a malt-peptone gelatin medium. It is necessary that the cells should be growing normally at the moment of measurement. There was a close correlation between water content and growth rate. A content of 88–90%, found in the hyphal apices, would appear to represent the opt. degree of inhibition for the plasma colloids of this fungus. The water content of the cells increases with increasing distance from the hyphal tips, eventually reaching a steady level. Vacuole formation begins in the transitional zone.

Kljajić (Radojica). **Utvrdjivanje letalnih doza gama zrakova Co-60 za neke fitopatogene gljive.** [Determination of lethal doses of Co-60 γ-rays for some phytopathogenic fungi.] *Arh. poljopr. Nauk.*, **13**, 39, pp. 96–103, 1960. [Engl. summ. 14 ref.]

The possibilities of using γ-radiation in phytopathology [cf. **40**, 26] were studied at Univ. Belgrade, Yugoslavia, on *Alternaria solani* (isolated from potatoes), *Ascochyta pisi* (pea), *Aspergillus niger* and *Botrytis cinerea* (vine), *Fusarium* [*oxysporum* f.] *vasinfectum* (cotton), *Helminthosporium turcicum* (maize), *Penicillium expansum* (apple), and *Trichothecium roseum* (plum). Lethal doses were very high (2×10^5–1×10^6 r.), particularly for *Alternaria solani*, *Ascochyta pisi*, *B.*

cinerea, and *F.o.* f. *vasinfectum* (6×10^5—1×10^6 r.) and also very variable for *T. roseum* and *Aspergillus niger* ($1–3\times10^5$) and for *B. cinerea* and *F.o.* f. *vasinfectum* (8×10^5—1×10^6). The mycelia of 3-day-old cultures of the 2 last named were more resistant than their conidia, for *H. turcicum* and *P. expansum* the relation was the reverse, and for *A. niger*, *T. roseum*, *Ascochyta pisi*, and *Alternaria solani* approx. equal. The mycelia of 24 hr.-old cultures were generally the most sensitive.

Parkinson (D.) & Waid (J. S.) (Editors). **The ecology of soil fungi—an international symposium.**—xi + 324 pp., 3 fig., 10 graphs, Univ. Liverpool Press, Liverpool, 1960. 42*s.* 6*d.*

Of the 28 reviews of recent work presented at this symposium in Liverpool in 1958, the following (each followed by a bibliography and a discussion) are of interest to phytopathologists.

J. H. Warcup on methods of isolation and estimation of activity; D. Parkinson & W. B. Kendrick on microhabitats; C. G. Dobbs & W. H. Hinson on fungal spores in soil; J. Montégut on the value of the dilution method; J. S. Waid on the growth of fungi in soil; A. G. Winter, H. Peuss, & F. Schönbeck on the influence of biotic factors on development; R. H. Thornton on the growth of fungi in some forest and grassland soils [**39**, 675]; P. W. Brian on antagonistic and competitive mechanisms; D. Park on antagonism; N. A. Burges on dynamic equilibria in soil; H. Katznelson on the rhizosphere effect; W. Maliszewska & R. Moreau on the fungal flora of the rhizosphere of *Abies alba*; C. G. C. Chesters on the decomposition of organic matter in the soil; and E. H. Garrard on *Streptomyces scabies* and actinomycete ecology. Other papers were on the decomposition of cellulose, lignin, and humic acid, and on the physiology of soil fungi; and some have been noticed in part [Sewell, **39**, 502; Guillemat & Montégut, **38**, 64; Dobbs, Hinson, & Bywater, **38**, 712, 714; Jackson, **38**, 653].

Christensen (Martha). **The soil microfungi of conifer-hardwood forests in Wisconsin.**—*Diss. Abstr.*, **20**, 11, pp. 4253–4254, 1960.

At Univ. Wis. soils from 36 conifer-hardwood forests in the north of the State were examined by the dilution plate method. The number of spp. of microfungi per forest ranged from 11–51, the most being obtained from soils supporting both conifer and broadleaved tree dominants. The species composition of the soil microfungal communities was correlated with the species composition of the cover vegetation. The second part of this thesis comprises descriptions of 44 new or noteworthy fungi from these soils.

Rambelli (A.). **Research into microfungi in soils planted with Eucalyptus.**—FAO/SCM/EU 60-10a. Italy, F.A.O., Rome, 5 pp., 1960. [Cyclostyled.]

Fungi isolated from soils in 4 eucalyptus plantations in Italy are listed (280 isolates, 28 spp.).

Chinn (S. H. F.), Ledingham (R. J.), & Sallans (B. J.). **Population and viability studies of Helminthosporium sativum in field soils.**—*Canad. J. Bot.*, **38**, 4, pp. 533–539, 1 graph, 1960.

At the Canada Dept Agric. Res. Sta., Saskatoon, a modification of the flotation-viability test for determining *H. sativum* [*Cochliobolus sativus*: **37**, 714] was evolved, incorporating a counting technique which, in a manner described, made possible a numerical estimate of the spores/g. of soil. By this means the population and viability of *C. sativus* spores from 2 locations in each of 100 cultivated fields in Sask. were determined in the spring. The numbers of spores in the samples varied from 8 to 893, averaging 118/g. soil. The spore populations of soils summer fallowed or under cereals during the preceding season did not differ significantly.

Viability of most of the spore samples ranged from 31–100%. The possibility of applying this method to the study of other soil fungi is suggested.

Wood (F. A.) & Wilcoxson (R. D.). **Another screened immersion plate for isolating fungi from soil.**—*Plant Dis. Reptr*, **44**, 7, p. 594, 1 fig., 1960.

A modification of Thornton's screened immersion plate [**36**, 125] was developed at the Dept Plant Path., Univ. Minn., St. Paul. Plates with about 25 ml. sterile water agar covered with a sterile plastic disk, 8·5 cm. diam. and 1 mm. thick with 12 2-mm.-diam. holes, were kept pressed against the soil profile for 2 or more days. Hyphae growing through the holes were isolated on to fresh plates. This method favoured the isolation of non-sporing soil fungi.

Porter (J. N.), Wilhelm (J. J.), & Tresner (H. D.). **Method for the preferential isolation of actinomycetes from soils.**—*Appl. Microbiol.*, **8**, 3, pp. 174–178, 5 fig., 1960.

In this method, evolved at the Lederle Labs., Amer. Cyanamid Co., Pearl River, N.Y., and using Benedict's modification of the Lindenbein medium (20 g. glycerol, 2·5 g. L-arginine, 1 g. NaCl, 0·1 g. $CaCO_3$, 0·1 g. ferrous sulphate, 0·1 g. magnesium sulphate, 20 g. agar l.) surface growth of organisms was obtained by pouring small quantities of the medium, held at 48° C. and containing the soil sample, on to set medium in a Petri dish. Addition to the medium of an antibiotic, pimaricin proving the best of those tried, at 50 μg. ml. suppressed growth of organisms other than actinomycetes and also enabled mould-infested cultures of *Streptomyces* to be rid of the contaminants.

Wallace (A.) & Lunt (O. R.). **Iron chlorosis in horticultural plants, a review.**—*Proc. Amer. Soc. hort. Sci.*, **75**, pp. 819–841, 1960. [148 ref.]

A useful review of causes and nature, and remedies.

Löhnis (Marie P.). **Effect of magnesium and calcium supply on the uptake of manganese by various crop plants.** *Plant & Soil*, **12**, 4, pp. 339–376, 4 pl., 1960.

At the Lab. Microbiol., Agric. Univ., Wageningen, Netherlands, excessive uptake of Mn and toxic injury to beans (*Phaseolus vulgaris*) were reduced by the addition of Mg or Ca in both field and nutrient culture experiments. Mg also affected the uptake of Mn and reduced symptoms in field experiments with chicory and *Glycine hispida*, and in culture experiments with turnip rape (*Brassica napus*).

Gandhi (S. C.) & Mehta (B. V.). **Studies on boron deficiency and toxicity symptoms in some common crops of Gujarat.** *Indian J. agric. Sci.*, **29** (*1959*), 1, pp. 63–70, 1960.

Sand cultures at Inst. Agric., Anand, Bombay, showed that B deficiency caused injury in Surati Indian bean (*Dolichos lablab*), onion, and var. 207 bajri (*Pennisetum typhoides*) with B at 0·001 p.p.m., in guvar (*Cyamopsis psoraloides*) at 0·01 p.p.m., and in K-49 tobacco at 0·1 p.p.m. Toxic injury was noticed at 0·5 p.p.m. in all these crops except tobacco (5 p.p.m.). Ca:B ratios for normal growth were 180·6 in *D. lablab*, 101·1 in tobacco, 78–107·7 in onion, 153·3 in guvar, and 323–525 in bajri.

Bull (R. A.). **Macronutrient deficiency symptoms in the Cocoyam (Xanthosoma sp.).**—*J. W. Afr. Inst. Oil Palm Res.*, **3**, 10, pp. 181–186, 1 col. pl. (6 fig.), 1960.

The symptoms of N, K, Mg, Ca, S, and P deficiency in sand-culture plants of a local white type of *Xanthosoma* grown in the E. Region of Nigeria are described and illustrated [cf. **36**, 401; **38**, 327].

Dingley (Joan M.). **New records of fungous diseases in New Zealand, 1958–59.** —*N.Z.J. agric. Res.*, **3**, 3, pp. 461–467, 1960.

Included in this list [cf. **38**, 674] are *Piricularia grisea* on *Digitaria sanguinalis*, *Alternaria porri* [map 350] and *Heterosporium allii* on leek, *Erysiphe cichoracearum* on potato and *Penstemon hartwigii*, *Pleospora herbarum* on lettuce and tomato, *Gibberella saubinetii* on tomato, *Corticium rolfsii* on onion, *Iris xiphium* (1st record of basidial state in N.Z.), tomato, and *Nerium filifolia*, and *Fusarium avenaceum* on *Matthiola incana*.

Deighton (F. C.). **African fungi I.**—*Mycol. Pap.* 78, 43 pp., 2 pl. (5 fig.), 22 fig., 1960. 12*s.* 6*d.*

Four new gen. of hyphomycetes, 11 new spp., and 2 new combinations are proposed. These include *Hansfordia cinnamomi*, causing a leaf spot of cinnamon in Sierra Leone.

Rieuf (P.). **Organismes pathogènes et saprophytiques des plantes au Maroc.** [Pathogenic and saprophytic organisms on plants in Morocco.]—*Cah. Rech. agron.* 9, 359 pp., 1960.

The 1st part (pp. 9–224) of this comprehensive publication [cf. **18**, 550] lists bacteria, cryptogams, phanerogams, and viruses in alphabetical order, with cross refs. to synonyms and the names of the hosts, including dates and localities of collection. A similar host index follows on pp. 227–359.

Annaliev (S. A.). Материалы к микофлоре Чапан-дага. [Materials for the mycoflora of the Chapan-dagh.]—Науч. Докл. высш. Школ. [*Nauch. Dokl. vÿssh. Shkol.*], biol. Sci., *1960*, 3, pp. 111–114, 1960.

A collection made in 1958 by the author in collaboration with the geobot. detachment of the Inst. Bot., Turkmen S.S.R., in the Chapan and Seamsur mountains, amounted to 65 spp. (28 genera, 7 fam.). Among new records for Turkmenia were *Puccinia scorzonerae* on *Scorzonera* sp., *Uromyces trifolii-repentis* on *Trifolium repens*, and *U. inaequalitus* on *Silene* sp.

Dzhafarov (S. A.). Талышда кənд тəсərруфат биткиləриндə паразитлик едən **Peronosporales** көбələкləри. [Fungi of the order Peronosporales parasitizing agricultural crops in the Talÿsh.]—Докл. Акад. Наук Азерб. ССР [*Dokl. Akad. Nauk Azerb. S.S.R.*], **16**, 3, pp. 293–297, 1960. [Azerb. with Russ. summ.]

During expeditions to the Lenkoran, Astara, and Masally regions of Azarbaijan in 1952–58, organized by the Inst. Bot. Azerb. Acad. Sci., 24 spp. were collected, including *Peronospora schachtii* on beet [map 28], *P. stigmaticola* on *Mentha piperita*, *P. arborescens* on opium poppy, and *P. trifoliorum* on clover [map 343].

Gäumann (E.). **Die Rostpilze Mitteleuropas.** [The rust fungi of central Europe.]—*Beitr. Kryptogamenfl. Schweiz*, **12**, 1407 pp., 1075 fig., 1959. [80 pp. ref.]

In all, 28 gen. are included, representing the Pucciniastraceae, Cronartiaceae, Chrysomyxaceae, Coleosporiaceae, Melampsoraceae, and Pucciniaceae. The species chosen are those that have been reported or might be expected to occur in Switzerland. The descriptions follow, as closely as possible, those of E. Fischer (*ibid.*, **2**, 2, 94+590 pp., 1904) and H. Klebahn (Uredineae. Kryptogamenflora der Mark Brandenburg, **5a**, pp. 69–903, 1914). Illustrations are largely taken from the literature. There are indexes to fungal and host names.

Karaca (I.). **Türkiye mycoflorasinda yeni Phyllosticta türleri.** [*Phyllosticta* species new to the mycoflora of Turkey.] –*Bitki Koruma Bül.*, **1**, 3, pp. 15–16, 1960. [Germ. summ.]

From the Fac. Agric., Ankara Univ., 4 new occurrences noted in 1959 in the Black

Sea region are reported: *P. coryli* on *Corylus avellana*, *P. cucurbitacearum* on vegetable marrow, *P. medicaginis* on lucerne, and *P. phaseolina* on *Phaseolus vulgaris*. Only *P. cucurbitacearum* is widespread and serious in the Black Sea region.

Dennis (R. W. G.), Orton (P. D.), & Hora (F. B.). **New check list of British agarics and boleti.** —*Trans. Brit. mycol. Soc.*, **43**, *Suppl.*, 225 pp., 1960.

This publication supersedes the revised list of British agarics and boleti [**28**, 143]. Part I consists of a systematic table of families and genera and the check list, arranged alphabetically under genera, with synonyms and misdeterminations in distinct type; part II is an alphabetical list of specific, varietal, and form epithets [The new taxa are described in *Trans. Brit. mycol. Soc.* **43**, 2, pp. 159–459, 512 fig., 1960.]

Cooke (W. B.). **The genera of pore fungi.**—*Lloydia*, **22**, 3, pp. 163–207, 1959. [103 ref.]

A discussion of the systematics of the Polyporaceae with a list of some 300 gen., their type spp., and an indication of their validity [cf. **39**, 679].

Harmsen (L.). **Taxonomic and cultural studies on brown spored species of the genus Merulius.** *Friesia*, **6**, 4, pp. 233–277, 23 fig., 7 graphs, 1960. [42 ref.]

From further studies at the Technological Inst., Copenhagen [**33**, 513], fully described, it is concluded that *M. lacrymans* differs specifically from *M. himantioides* [cf. **38**, 62]. Both are heterothallic (diaphoromictic), tetrapolar, and mutually incompatible. It is suggested that *M. americanus* [cf. **33**, 125; **38**, 721], *M. brassicaefolius*, and *M. silvester* [cf. **38**, 283] are synonymous with *M. himantioides*. *M. pinastri* [cf. **30**, 132] was found to be specifically different from *M. tignicola* [**31**, 525]. Ability to decompose wood was independent of the growth rate and the genetic constitution of single-spore cultures. A new var., *M. lacrymans* var. *shastensis* [cf. Cooke, *Mycologia*, **35**, pp. 277–293, 1943], is proposed.

Sergeeva (Mme K. S.). Новые виды рода **Chaetomium** и их изменчивость. (**Species novae generis Chaetomium et earum mutabilitas.**) [New species of the genus *C.* and their variability.] *Bot. Mater. (Notul. syst. sect. crypt. Inst. bot. Acad. Sci. U.S.S.R.)*, **13**, pp. 167–175, 3 fig., 1960.

Descriptions are given of *C. tenuissimum* from soil, *C. subglobosum* from filter paper on which oat seeds were germinating, and *C. subspirilliferum* from soil, all n. spp. They were studied in culture on *Melilotus* stalks and strips of plywood with water; filter paper soaked with nutrients [ingredients listed]; and filter paper containing agar with the same nutrients.

Gordon (W. L.). **The taxonomy and habitats of Fusarium species from tropical and temperate regions.** *Canad. J. Bot.*, **38**, 4, pp. 643–658, 1960.

This study covers 1,200 *F.* isolates received by the author over 25 yr. from tropical and temperate regions [cf. **36**, 501; **38**, 581; **39**, 673]. The host plants of 90% of the isolates totalled 160, and included crops as well as non-cultivated plants. The remainder of the isolates were obtained from habitats such as soil, water, wood pulp, etc. The isolates were distributed among 26 spp., 4 vars., and 17 f. spp., which are cited. The most widely distributed were *F. solani*, *F. oxysporum*, *F. equiseti*, *F. moniliforme* [*Gibberella fujikuroi*], *F. avenaceum*, and *F. semitectum*.

Jung (M.) & Rochelmeyer (H.). **Zur Morphologie und Cytologie von Claviceps purpurea (Tulasne) in saprophytischer Kultur.** [On the morphology and cytology of *C. purpurea* in saprophytic culture.]—*Beitr. Biol. Pfl., Berlin*, **35**, 3, pp. 343–378, 33 fig., 1 graph, 1960.

A study of the mycelium and conidia from the Pharmazeutisches Inst., Johannes Gutenberg Univ., Mainz, Germany.

Khan (A. H.). **Biology and pathogenicity of Rosellinia necatrix.**—*Biologia, Lahore*, **5**, 2, pp. 199–245, 17 fig., 1959. [104 ref. Received Sept. 1960.]

Introductory notes are given from the Pakistan For. Res. Inst., Abbottabad, on 12 spp. of *Rosellinia*, followed by discussion of the nomenclature of *R. necatrix* and an account of its distribution, host range, morphology, pathology, and control, and of some pathogenicity experiments carried out by the author in California [**35**, 532]. *Citrus* [*Poncirus*] *trifoliata* was the least, and rough lemon the most, susceptible in trials with citrus seedlings, and an isolate from peony was the most virulent in effect on 6-month-old citrus seedlings, followed by one from pear.

Rao (P. N.) & Salam (M. A.). **Hyperparasites on rust fungi.**—*Sci. & Cult.*, **25**, 10, pp. 601–603, 3 fig., 1960.

Descriptions from Osmania Univ., Hyderabad, are given of 2 n. spp., *Cercospora aecidiicola* on the aecia of *Trochodium sampathens* on the leaves of *Argyreia cymosa*, and *C. riveae* on the aecia of *T. ajrekari* on the leaves of *Rivea ornata*, and also *C. cladosporioides* on *Aecidium oleae* on the leaves of *Olea dioica*.

Makkonen (R.) & Pohjakallio (O.). **On the parasites attacking the sclerotia of some fungi pathogenic to higher plants and on the resistance of these sclerotia to their parasites.**—*Acta agric. scand.*, **10**, 2–3, pp. 105–126, 9 fig., 1960.

Much of this work at Dept Plant Path., Univ. Helsinki, Finland, has been noticed [**38**, 65]. Large sclerotia were more susceptible than small ones of the same sp. At 20° C. the sclerotia of *Claviceps purpurea*, *Botrytis cinerea*, and *Sclerotinia borealis* appeared very susceptible; those of one isolate of *S. sclerotiorum* were relatively resistant while other isolates varied considerably in resistance, one resistant isolate giving rise to a susceptible saltant. In sclerotia of *S. sclerotiorum*, *S. trifoliorum*, and *B. cinerea* the hyphae of *Acrostalagmus roseus* [*Verticillium roseum*] penetrated between the radial rows of cortex cells.

Karhuvaara (Laura). **On the parasites of the sclerotia of some fungi.**—*Acta agric. scand.*, **10**, 2–3, pp. 127–134, 6 fig., 1960.

Hyperparasites of some plant pathogenic fungi are described from Dept Plant Path., Univ. Helsinki: *Mucor hiemalis* from *Claviceps purpurea*, *Trichoderma viride* from *Sclerotinia trifoliorum*, *Penicillium lilacinum* from *S. sclerotiorum* (an agar culture), *P. frequentans* from *S. borealis*, and *Gliocladium roseum* from *S. trifoliorum* [cf. above].

Talboys (P. W.). **A culture-medium aiding the identification of Verticillium alboatrum and V. dahliae.**—*Plant Path.*, **9**, 2, pp. 57–58, 1 pl. (3 fig.), 1960.

At East Malling Res. Sta., Kent, it has been found that *V. alboatrum* and *V. dahliae* can be readily distinguished on a medium containing 100 ml. conc. prune extract, 5 g. lactose, 1 g. difco yeast extract, 30 g. agar, + distilled water to make 1,000 ml.; the pH is adjusted to 5·8–6. After incubation at 22° C. verticillate conidiophores of both spp. appear in 3 or 4 days. With continued growth the microsclerotia of *V. dahliae* develop an intensely black pigmentation, most of the remaining mycelium being hyaline, giving the reverse of the colony a 'gritty' appearance, while the reverse of *V. alboatrum* is characteristically 'fibrous'. The aerial mycelium of *V. dahliae* is profuse and fluffy and conidiophores are sparse, whereas that of *V. alboatrum* is sparse and the conidiophores very numerous, giving the colony surface a grey 'mealy' appearance. Identification should be checked microscopically to avoid possible confusion with *V. tricorpus*.

Dade (H. A.). **On mounting in fluid media, with special reference to lactophenol.**—*J. Quekett micr. Cl.*, Ser. 4, **5**, 11, pp. 308–317, 3 fig., 1960.

Following detailed descriptions of mounting procedure with lactophenol, either

alone or containing trypan blue, with special reference to its use with microfungi, a new method for making these preparations permanent is given. This involves sealing the edge of the coverslip with a synthetic epoxy resin obtainable under the trade name araldite. One thick layer only of resin is required, applied over a narrow, preliminary 'anchoring' layer of nail lacquer, and after 2 or 3 days at room temp. it hardens and gives a really permanent mount.

Morgan (N. G.). **A simple suction apparatus for the uniform deposition of dry fungal spores on detached leaves.** - *Rep. agric. hort. Res. Sta. Bristol, 1959*, pp. 126–129, 2 pl., [1960].

The apparatus described was designed to collect fungus spores by suction from pure cultures and distribute them uniformly over leaf surfaces [cf. **33**, 199]. A bell-jar with a tubulure at the side near the base is placed on a sheet of Al on which the leaves lie, and connected to a suction pump, the amount of suction being adjusted by an incorporated leak tube. Adhesion of the Al sheet on raising the jar indicates sufficient vacuum. A glass inlet tube passing through the bung of the jar is connected by rubber tubing to a shaped glass tube introduced into the spore culture bottle to suck the spores up, loss of spores through the outlet being reduced by a muslin filter. Alternatively, a standard bell-jar may be used, with an outlet tube extending from the top to the side near the base, instead of the tubulure. When a spore cloud is seen in the jar, with the aid of a strong beam of light, the suction is cut off and the spores allowed to settle by gravity.

Sitterly (W. R.) & Buckner (G. L.). **A simple and inexpensive tractor-mounted inoculum applicator.**—*Plant Dis. Reptr*, **44**, 7, pp. 532–533, 2 fig., 1960.

The applicator, described from Clemson Coll. Truck Exp. Sta., Charleston, S. Carol., is attached to the draw of a tractor and consists of a 10-gal. stainless steel tank, a small air compressor, and a hose, wand, and nozzle from a knapsack sprayer. It has been used successfully to inoculate plants with both viruses and fungi.

Guthrie (J. W.) & Bishop (G. W.). **An easily constructed clip-type insect cage.**—*Plant Dis. Reptr*, **44**, 7, pp. 592–593, 2 fig., 1960.

A description of a small, light-weight cage for confining aphids, used in virus experiments on potatoes at the Univ. Idaho Exp. Sta., Aberdeen.

Roland (G.). **Virologie et botanique.** [Virology and botany.] *Bull. Soc. Bot. Belg.*, **92**, 1–2, pp. 103–109, 1960. [15 ref.]

After a brief historical introduction the author discusses some of the problems presented by virus diseases of plants, including the cytological changes induced, the effects on morphology and physiology, taxonomic relations between plants considered with reference to virus diseases, and genetics.

Hollings (M.) & Lelliott (R. A.). **Preservation of some plant viruses by freeze-drying.**—*Plant Path.*, **9**, 2, pp. 63–66, 1960. [11 ref.]

At the Plant Path. Lab., Harpenden, Herts., 46 isolates of 39 plant viruses were subjected to rapid sublimation of water from frozen suspensions and subsequent storage under vacuum (freeze-drying) [cf. **39**, 681]. Infective virus was recovered from preparations of all strains, except 1 of potato virus A, after 4–11 months' storage. Spherical viruses appeared to lose little if any of their infectivity during freeze-drying, though several rod-shaped viruses lost much, but no further serious loss of infectivity was noted in 45 of the preparations during storage.

Kaper (J. M.). **De functie van de eiwit- en nucleine-zuurcomponenten bij plantenvirussen.** [The function of the protein and nucleic acid components of plant

viruses.]—*Chem. Weekbl.*, **56**, 15, pp. 221–226, 6 fig., 2 diag.; 16, pp. 233–239, 1960. [Engl. summ. 135 ref.]

An up-to-date survey of recent advances with special emphasis on virus architecture, the segregation of the protein and nucleic acid components and their reconstitution into infective entities, the problem of genetic differences in virus strs., and the course of the infection process.

Sverak (Lydia). **Radioaktive Indikatoren in der Erforschung phytopathogener Viren.** [Radioactive indicators in research on phytopathogenic viruses.] – *Atompraxis*, **6**, 1, pp. 43–50, 1960. [*Biol. Abstr.*, **35**, 14, p. 3444, 1960.]

In this review of current problems in phytopathogenic virus research, from the Univ. Vienna, it is pointed out that virus metabolism can be studied only by using labelled atoms, mainly P^{32} and C^{14}. Either the virus or the substrate is labelled. A method is described for producing C- and P-labelled tobacco mosaic virus having high specific activity. The radioactive C is measured by means of a gas Geiger counter. Use of radioactive indicators showed that virus protein and virus nucleic acid are synthesized from low-molecular compounds, no use being made of higher molecular fractions originating from the decomposition of cell components. Attempts at virus inhibition with antagonists of nucleic acid synthesis are summarized.

Wu (J.-H.), Hildebrandt (A. C.), & Riker (A. J.). **Virus-host relationships in plant tissue culture.**—*Phytopathology*, **50**, 8 (1), pp. 587–594. 5 fig., 15 graphs, 1960. [28 ref.]

At Univ. Wis., Madison, the cell morphology of a single-cell clone (H 239) of tobacco ×*Nicotiana glutinosa* changed as the culture aged: young cultures (largely meristematic) proved more resistant to tobacco mosaic virus (TMV) infection and or multiplication than older ones. A single-cell clone (M 222) of tobacco tissue, inoculated with TMV from the field, during a series of 7 subcultures selected an abnormally mild str. of the virus from a number of strs. in the original inoculum. Both infected and healthy tissue grew well *in vitro*, but the former was brownish yellow and differed somewhat in growth response to uracil and its analogues [cf. **39**, 623]. The infectivity of TMV in tissue-culture homogenates was correlated with the rapidity of inhibition of tissue growth by penetrating chemicals. Slow inhibition favoured an increase of TMV, whereas abrupt cessation of growth, as brought about by high concs. of 2-6-diaminopurine, resulted in lessened infectivity. Apparently, active cell division accounts for low infectivity unit fresh wt. of tissue, synthesis of nucleoprotein competing with that of TMV. Growing tissues infected with the very mild str. of TMV in the presence of chloramphenicol and pyrimidine analogues such as the bacteriophage mutagen 5-bromouracil produced no mutants.

Weintraub (M.), Kemp (W. G.), & Ragetli (H. W. J.). **Studies on the metabolism of leaves with localized virus infection. 1. Oxygen uptake.**—*Canad. J. Microbiol.*, **6**, 4, pp. 407–415, 1 graph, 1960.

In further studies at the Plant Path. Lab., St. Catherines, Ont. [**35**, 331], local lesions were produced and O uptake significantly increased by infection of *Nicotiana glutinosa* with tobacco mosaic virus [cf. **39**, 41], *Dianthus barbatus* with a carnation virus, *Gomphrena globosa* with potato virus X, and tobacco with 2 strs. of turnip mosaic virus. When *N. glutinosa* was kept at 22° C. the increase in respiration was detected 7–10 hr. before the appearance of lesions; at 32° the rise occurred 8–15 hr. before lesion formation. The other host-virus combinations gave essentially similar results. As lesions produced artificially, with no virus

present, did not induce a similar rise in respiration, the increased respiration seemed to be correlated with virus activity apart from the necrotic process.

Bradish (C. J.) & Crawford (L. V.). **Biophysical studies of the interactions between the viruses of Tobacco mosaic and Tomato bushy stunt and their Rabbit antisera.**—*Virology*, **11**, 1, pp. 48–78, 4 fig., 19 graphs, 1960.

At the Virus Lab., Univ. Calif., Berkeley, light scattering procedures, used to investigate the interactions of these viruses with their respective rabbit antisera, were found to be especially suitable for kinetic studies and for quantitative titrations.

Yarwood (C. E.). **Soil inhibits infection with Tobacco necrosis virus.**—*Plant Dis. Reptr*, **44**, 8, pp. 639–642, 1960.

In further studies at the Dept Plant Path., Univ. Calif., Berkeley [cf. **39**, 560], 10% of the test plants (including *Cleome spinosa*, bean [*Phaseolus vulgaris*], cucumber, cowpea, tobacco, tomato, and sugar beet) became infected when tobacco necrosis virus (TNV) from a suspension of infected cowpea leaves was poured over the soil in which they were growing. Three times as much infection was obtained when a suspension of infective soil was used as inoculum (by shaking the soil root mass of infected potted plants in water), though local lesion assay showed less virus to be present than in the leaf suspension. When germinated cucumber seeds grown on moist blotting paper were inoculated with infected leaf suspension 77% of the plants became infected, but when such plants were transferred to soil immediately after inoculation only 12% became infected. When healthy seeds or seedlings were grown in infested soil, 83% became infected. The addition of either autoclaved or unautoclaved soil to leaf inoculum reduced its infectivity.

These results suggest that soil contains a virus infection-inhibiting power similar to its spore germination-inhibiting power [cf. **38**, 712].

Shanks (C. H.). **Protection of plants from some aphid-transmitted viruses.**—*Diss. Abstr.*, **20**, 10, pp. 3910–3911, 1960.

In field trials at the Univ. Wis., a soil application of thimet [cf. **38**, 221] gave a good reduction of cucumber mosaic virus infection in 1956 but was less effective the following year. Am. cyanamid 12008 on the foliage was almost as effective in 1957 as in 1956. Significant reduction of aster yellows virus infection was given by tabutrex – parathion and Bayer 25198 in 1958. Aphids on parathion-treated tobacco leaves made longer feeding probes than those on untreated leaves; DDT had the opposite effect. Inoculations of potato virus Y by viruliferous aphids were increased by DDT and decreased by parathion, but initial acquisition of the virus was unaffected by either material. Alate *Myzus persicae* remained on DDT-treated foliage for shorter periods and on parathion- and thimet-treated for longer than on untreated. Viruliferous aphids were more attracted to parathion-treated tobacco plants than to the untreated, with a consequent increase in infections, but inside cages aphid dissemination of the virus was reduced by parathion.

In greenhouse experiments with antiviral chemicals 5 p.p.m. cytovirin spray on tobacco reduced potato virus Y by 79% and cucumber mosaic virus by 50% when the viruses were mechanically transmitted. With aphid transmission and 25 p.p.m. cytovirin there was less effect on virus Y and none on cucumber mosaic. The effectiveness of cytovirin against aphid-transmitted potato virus Y was not affected by wetting agents or the presence of potato virus X. Cytovirin on potato virus Y-infected foliage did not interfere with acquisition by aphids nor did it have any direct effect on virus when fed to viruliferous aphids. Aphid-transmitted potato virus Y infections on tobacco were reduced by about 50% by 10 or 20 p.p.m. trichothecin, which had no effect on cabbage virus B [cauliflower mosaic

virus str.], but reduced PEVM [? pea enation mosaic virus on pea] by 42%. A mixture of cytovirin and trichothecin (25 p.p.m. each) stopped most potato virus Y infections but was very phytotoxic.

Kovachevski (I.). Болезнь столбур и средства борьбы с ней в Болгарии. [Stolbur disease and control measures in Bulgaria.]—*Меж. сел.-хоз. Ж.* [*Mezh. sel.-khoz. Zh.*], **3**, 5, pp. 65–72, 1959.

After a discussion of the general distribution of [tomato] stolbur virus [cf. **38**, 175] in Bulgaria, symptoms and incidence are indicated for various hosts. Most susceptible are pepper [*Capsicum*], eggplant, and potato, with up to 95% infection. Tomato usually has 15–25% infection, occasionally 50%; tobacco, not exceeding 5–6% in N. Bulgaria; carrot and celery are infected up to 30–40% in areas where the disease is prevalent, and parsley to a lesser extent; other hosts are *Atropa belladona*, *Datura stramonium*, and *Physalis peruviana*. The wild hosts detected at the Inst. for Plant Prot., Sofia, were: *Solanum nigrum*, *S. dulcamara*, and *Convolvulus arvensis*, the last being the primary host of the vector *Hyalesthes obsoletus*, and the reservoir of tomato stolbur virus. Of 34 wild spp. of Solanaceae studied in 1954–58, only *Nicandra physaloides* and *S. aviculare* were resistant, but infection can be masked in the latter after inoculation with stolbur scions. Some of the results of experiments in chemical and agrotechnical control made in recent yr. are given.

Thresh (J. M.). **Capsids as a factor influencing the effect of swollen-shoot disease on Cacao in Nigeria.**—*Emp. J. exp. Agric.*, **28**, 111, pp. 193–200, 1960.

Monthly observations organized by the W. African Cocoa Res. Inst., Nigerian Substa., Ibadan, in areas with natural outbreaks of swollen shoot in the Abeokuta and Ibadan Provinces [**40**, 34], revealed that the poor condition of the trees was more closely related to the incidence of capsid damage and associated die-back due to *Calonectria rigidiuscula* than to swollen shoot infection. Where capsid damage was severe and not controlled, virus-infected trees were worse than their neighbours and often died within a few years. These findings suggest an ecological approach to the control of swollen shoot, with due regard to the interaction of pests and diseases in their environment.

Wharton (A. L.) & Burge (G. A.). **Black pod disease of Cocoa in Ghana.**—*Ghana Fmr*, **4**, 1, pp. 18–23, 2 fig., 1960.

During the last 4 yr. 27% of cacao pods harvested were infected by *Phytophthora palmivora* [**40**, 32], resulting in a 17% av. loss of crop. The national crop is 240,000 tons, in addition to 49,000 destroyed by black pod, a net loss of £G 12,300,000 p.a. These data refer only to farms harvested by the Div. Agric.; taking the whole country into account the actual loss must be much greater. Cultural operations recommended include the removal of diseased pods at weekly intervals (particularly in Apr.–July), more frequent harvesting of mature pods, and thinning the cacao canopy where necessary, with removal of unnecessary forest trees in conjunction with capsid control measures [cf. above].

Schieber (E.) & Sosa (O. N.). **Cacao canker in Guatemala incited by Ceratocystis fimbriata.**—*Plant Dis. Reptr*, **44**, 8, p. 672, 1960.

C. fimbriata is reported for the 1st time on cacao [cf. **39**, 401] in Guatemala. A secondary pathogen, *Diplodia* [*Botryodiplodia*] *theobromae*, is sometimes also present in the cankers.

Shestiperova (Mme Z. I.). Роль злаковых трав в распространении стеблевой ржавчины. [The role of cereal grasses in the dissemination of stem rust.]—*J. agric. Sci., Moscow*, **5**, 6, p. 129–131, 1960. [12 ref.]

Observations by the Leningrad agric. Inst. in field and laboratory in 1956–58

showed that cereals are not directly infected by *Puccinia graminis* [cf. **39**, 163] from aecidia on barberry. Of the several biological forms of *P. graminis* having a different specialization in different zones of the U.S.S.R. that predominating in the N.W. zone, f. *agropyri* (*secalis*) infects many cereals. It does not infect wheat or oats directly, the former being infected through barley and the latter through *Dactylis glomerata*. Field tests with Vyatka winter rye and Lutescens 062 spring wheat showed that infection was reduced by nutrient elements and combinations of them. The best results in the field were obtained with 5 ton humus+$N_{45}P_{90}K_{60}$/ha. Plants were most resistant with high P and K in a mineral mixture. For the N.W. zone the eradication of barberry bushes near crops is advocated, with increased doses of P+K.

Johnston (C. O.). **Pathological problems in developing new Wheat varieties.**—*Cereal Sci. To-day*, **5**, 4, pp. 100–101, 109, 1960.

Valuable information is presented on the periodical advance and regression of diseases, complicating the development of resistant vars. in Kans., including wheat streak and soil-borne mosaic viruses and stripe rust (*Puccinia striiformis*); the sudden movement of stripe rust from N. Mex. into the wheat-growing area of the central U.S. plains in epiphytotic amount during 1957 and 1958 [**38**, 506] is attributed to an increase, which is still continuing, in the acreage under the crop in N. Mex., combined with exceptionally favourable weather conditions. Turkey, Kharkof, and Cheyenne have shown satisfactory field resistance.

Macindoe (S. L.) & Walkden Brown (C.). **Wheat breeding and varieties in Australia.** *–Sci. Bull. Dep. Agric. N.S.W.* 76, 233 pp., 99 fig., 7 graphs, 1958. [Received Aug. 1960.]

In a revised edition of this booklet (1st. ed., 1952) the sect. on the early history of wheat vars. includes a note (p. 18) on the threat of flag smut [*Ustilago nuda*: **35**, 362, 585] and another section (pp. 24–30) deals with recent breeding for resistance to stem rust [*Puccinia graminis*: **39**, 372].

Gorlach (A. A.). Селекция озимой Пшеницы на устойчивость к грибным болезням и вредителям в лесостепи УССР. [Selection of winter Wheat for resistance to fungus diseases and pests in the forest steppe of the Ukrainian S.S.R.]—*Sel. Seed-Gr., Moscow*, **25**, 4, pp. 58–61, 1 fig., 1960.

In this survey from the Belotserkov exp. Select. Sta. for Sugar Beet, Lesostepka 75 is stated to have possessed combined resistance to brown and yellow rusts [*Puccinia recondita* and *P. striiformis*: cf. **39**, 464], though it has recently lost its resistance to the former. Lutescens 200, with high resistance to wet smut [*Tilletia caries*: cf. **39**, 298] for over 30 yr., is recommended as selection material. Lesostepka 75 is the most resistant var. to loose smut [*Ustilago nuda*: cf. **39**, 466]. Belotserkovskaya 198, a recent hybrid (*Erythrospermum* 15 / Koveĭl), has complex resistance to pests and diseases, including *P. recondita*, *P. striiformis*, *T. caries*, and *U. nuda*, and to drought and winter conditions: it yields well, produces good grain, and is widely used in the Ukraine.

Khar'kova (Mme A. P.) & Sebto (A. G.). Повышать устойчивость Пшеницы против ржавчины в Приморье. [Increasing the resistance of Wheat to rust in Primor'e.]—*Sel. Seed-Gr., Moscow*, **25**, 4, pp. 62–63, 1960.

The Far East Sta., All-Union Inst. Plant Growing, is assessing wheat vars. for resistance to fungus diseases in the valley of the Lyangchihe river, Murav'ev-Amur peninsula, where the damp climate favours heavy infection. *Puccinia graminis* [cf. **39**, 16] is the most serious pathogen. Comparatively resistant were Dal'nevostochnaya, Primorskaya 3, Primorskaya 4, some lines from the U.S.A. (22179, 39628, and 33211) and Canada (34031 and 34034), and derivatives from

Triticum timopheevi and *T. monococcum*. *P. triticina* [*P. recondita*] is less serious and *P. glumarum* [*P. striiformis*] occurs only occasionally. The following lines from the Inst. collection have been developed during the last 8 yr. with complex resistance to all rusts: Erythrospermum 22179, Erythrospermum 39628, Lutescens 38414, and 39628 DS-P from the U.S.A. and 17318 from Palestine. Again, the best were those derived from *T. timopheevi*, and *T. monococcum*. Other promising rust resistant vars. in the Primor'e include Primorskaya 1, Manakinka, and Amurskaya 71, 72, and 75.

Santiago (J. C.) & Salazar (J.). **Epidemiología de la roya negra del Trigo Puccinia graminis tritici en España y Portugal en 1958.** [Epidemiology of black rust of Wheat (*P.g.* f.sp. *tritici*) in Spain and Portugal in 1958.] *An. Asoc. exp. Progr. Cienc.*, **25**, 1, pp. 231–242, 3 graphs, 4 maps, 1960.

An analysis of the physiologic races of *P. graminis* in certain European countries [cf. **39**, 687] and the Near East reveals close analogies, 14, 16, 21, 24, 34, 40, 75, 116, 176, and 186 for instance, being common to Portugal [**36**, 687] and Spain [**39**, 162], while all except 176 have been reported from France.

At the 1st inspection in 1958, during the 2nd half of Jan. and early Feb., there was no sign of black rust, probably on account of the exceptionally dry weather, but between 25 Mar. and 10 Apr. 5 foci were detected in Spain and 1 in Portugal, the former in Almeria, Alicante (20–40% infection), Murcia (2), and Sevilla, and the latter in Mertola (40–60). The races identified were 21, predominant in Europe of recent years, and to a lesser extent 14, 34, 17, and 186. Later, at ripening, attacks of max. intensity were found in the valleys of the Guadalquivir and Duero (Spain) and along the Alemtejo coast and in the Braga and Mirandela regions of N.E. Portugal. Uredospore-trapping experiments showed that a very early and possibly important source of infection appears to lie to the E.-S.E. of the Peninsula, indicating the need for a study of potential supplies of inoculum in N. Africa. The final surveys were made in the mountains at the end of Aug. and beginning of Sept., when the rust was found in abundance over a belt 60 km. wide in the Cordillera Cantabrica at 2,000 m. and over. Local conditions favour the dissemination of uredospores by wind and their persistence on green tillers, probably right through the autumn, and are adverse to the attainment of full maturity by the crop. At this time, moreover, *Agropyron repens* was found to be heavily infected over a wide area of the Navarro-Aragonese Pyrenees.

Wang (D.). **A study of the distribution of carbon-14 labelled compounds in stem rust infected Wheat leaves.**—*Canad. J. Bot.*, **38**, 4, pp. 635–642, 2 pl., 1960. [15 ref.]

In further studies at the Dept Bot., Univ. Man., Winnipeg [cf. **38**, 589], radioautographs of Little Club wheat leaves infected by *Puccinia graminis* and fed with glucose-U-C^{14}, glycine-2-C^{14}, benzimidazole-2-C^{14}, and $C^{14}O_2$, supported the findings of previous workers [cf. **38**, 111] that C^{14} accumulated in diseased parts. Quantitative measurements, however, indicated that the rusted parts did not contain more radioactivity than healthy ones, and that the phenomenon of radioactivity accumulation shown by radio-autographs is due to (*a*) a geometric factor with respect to radioactive sources to the X-ray film, and (*b*) the specific distribution with respect to the higher radioactivity in the rapidly growing regions of the fungus which tend to accumulate near the surface of the pustule.

Samborski (D. J.) & Forsyth (F. R.). **Inhibition of rust development on detached Wheat leaves by metabolites, antimetabolites, and enzyme poisons.**—*Canad. J. Bot.*, **38**, 4, pp. 467–476, 1960. [29 ref.]

Of the purines and pyrimidines used in further tests at the Plant Path. Lab.,

Canada Dept Agric. Res. Sta., Winnipeg, Man. [cf. **39**, 565], on detached leaves of Little Club wheat floated on solutions containing benzimidazole, only thymine and azathymine inhibited development of *Puccinia recondita* and *P. graminis*. The inhibitory action of the antivitamin oxythiamine was competitively revoked by thiamine. Development was also inhibited by histidine, isoleucine, methionine, and serine, inhibition being reversed by glycine except when serine was used. The amino acid analogues canavanine, ethionine, and *p*-fluorophenylalanine all inhibited, these reactions being reversed by arginine, methionine, and phenylalanine, respectively. Among the carbohydrates effective inhibitors were lyxose, xylose, and sorbose, and the sugar alcohols. The enzyme poisons NaF and Na azide also inhibited.

Smith (E. L.), Sebesta (E. E.), Schlehuber (A. M.), & Young (H. C.). **Association of certain characters in a collection of Wheat × Wheatgrass hybrids.**—*Tech. Bull. Okla. agric. Exp. Sta.* T-82, 31 pp., 2 fig., 1960. [44 ref.]

Tables are presented giving full data on the association of head type, maturity, leaf roughness, awn condition and glume pubescence with leaf rust [*Puccinia recondita*: cf. **40**, 38] reaction in the mature plant in 542 advanced generation wheat × *Agropyron*, rye, and *Aegilops* hybrids. Less than 20% hybrids possessed immunity from *P. recondita*, which was higher in late-maturing, grass-like and rough leaved plants. Some wheat-like selections were highly resistant as seedlings and immune at maturity. Recent work on the cytogenetics of wheat-*Agropyron* hybrids is reviewed.

Muszyńska (Mme K.). **Badania nad rdzą brunatną Pszenicy w Polsce (Puccinia triticina Erikss.).** [Investigations on brown rust of Wheat (*P. recondita*) in Poland.] –*Hod. Rośl. Aklim. Nasien.*, **4**, 2, pp. 149–166, 1960. [Russ., Engl. summ. 17 ref.]

The results of the evaluation of the resistance of 147 wheat vars. and lines by the Plant Breeding and Acclimatisation Inst., Sect. Cereals, Cracow, in 1955–58 are presented. From material collected in 7 different localities the races 52, 61, 114, 126, and 129 [cf. **33**, 716] were identified.

Macer (R. C. F.). **Further observations on the saprophytic and parasitic behaviour of Cercosporella herpotrichoides.** Abs. in *Trans. Brit. mycol. Soc.*, **43**, 2, pp. 461–462, 1960.

In further work *C. herpotrichoides* [**39**, 100] was found to possess a very low competitive saprophytic ability and was therefore like a 'root-inhabiting' fungus. When wheat nodal straw was colonized [cf. **35**, 94] in competition with the soil microflora the degree of colonization of the stem was lower than that of the leaf sheath and 3 concentric internodal straw layers. In comparison, *Fusarium culmorum* [loc. cit.] is a much more vigorous and competitive saprophyte. It is unlikely that *C. herpotrichoides* exists freely in soil or is an active colonizer of plant debris in competition with soil saprophytes [cf. **40**, 2]. From 1954–59 large areas of wheat were mass-inoculated with the eyespot pathogen and the most resistant var. was consistently Cappelle Desprez (1·5% loss in yield), compared with the susceptible Yeoman (20·9%) and Yga Blondeau (33·4%).

Purdy (L. H.) & Holton (C. S.). **Fungicide vapor action, ineffective in Wheat smut control by seed treatment.**—*Phytopathology*, **50**, 8 (1), pp. 581–583, 1960.

In trials at Wash. agric. Exp. Sta., Pullman, with 4 Hg products and anticarie, though some slight control was obtained, it was evident that fungicidal vapour action is non-effective against wheat smut (*Tilletia* spp.) [cf. **36**, 181] under commercial seed-treating conditions.

Dodov (D. N.) & Todorova (Mme V. I.). Полумокро обеззаразяване на Пшеничното семе срещу мазната главня с разтвор от син камък. [Semi-wet disinfection of Wheat seed against bunt with a solution of Cu sulphate.]—Науч. Труд. М-во Земед. Гор. Науч. Инст. Защ. Раст. [*Nauch. Trud. M-vo Zemed. Gor. Nauch. Inst. Zasht. Rast.*], *1958*, 1, pp. 7–61, 1958. [Russ., Engl. summ. Abs. in *Referat. Zh. Biol., 1960*, 8, p. 186, 1960.]

In tests in 1941–46 at the Sofia Inst. for Plant Prot., Bulgaria, with several fungicides against wheat bunt [*Tilletia caries*: cf. **39**, 405] the best control was given by a semi-wet seed treatment with 2% $CuSO_4$ (4 l. solution 100 kg. seed). Treated seed does not require drying and can be stored for a long period without loss in germinating capacity. Advantages of this method are the low toxicity of Cu to man and animals and the relatively small cost.

Mantle (P. G.). **Hypersensitivity of Wheat to loose smut.**—Abs. in *Trans. Brit. mycol. Soc.*, **43**, 2, p. 462, 1960.

The hypersensitive reactions of the young wheat plant depend on how far *Ustilago tritici* [*U. nuda*: cf. **40**, 41] penetrates into the plumular bud of the embryo. Various types of entry are described, and their effects. Infection of the bud may cause the death of the seedling. Some spring and winter vars. in Great Britain have given a hypersensitive reaction to races of *U. nuda* present [cf. **25**, 160].

Krivchenko (V. I.). Прибор для заражения Пшеницы и Ячменя пыльной головней. [Apparatus for infecting Wheat and Barley with loose smut.]—*Sel. Seed-Gr., Moscow*, **25**, 3, pp. 66–67, 1 diag., 1960.

This apparatus for inoculating loose smut [*Ustilago nuda*: cf. **36**, 183] was tested in the field for 2 yr. at the N. Ossetic agric. exp. Sta. Up to 95% infection was obtained in susceptible vars. Up to 3,000 ears could be treated in 8–10 hr. by 2 manipulators. The apparatus consists of a glass cylinder ending in 2 glass tubes at the top, one for air intake, the other (bent) attached by a rubber tube to a Komovskii evacuation pump. Diam. of the tube is such that it begins to contract when the residual atmospheric pressure in the cylinder is equal to 100–120 mm. Hg. Rubber tubing used for blood-transfusions is very suitable. The apparatus does not require a manometer, vacuum flask, or vacuum cocks, which greatly simplifies it and reduces its wt. The lower part of the cylinder is slightly expanded for the introduction of a bung with an outer layer (16 mm.) of finely porous rubber. An opening (8–9 mm. diam.) in the bung has a short glass tube (8–12 mm. diam.) connected with a rubber tube for the introduction of the spores. An incision takes the stalk of the spike. At 8–9 mm. from the wide base there are 2 stays, made of pieces of rubber, fastened with screws. The walls of the bung and its cut section should be smeared with vaseline before infection to ensure airtightness. A bottle (0·5–0·75 l.) is used for the spore suspension (0·5 g. spores/l. water).

Spikes (3–8) close together and of the same height are selected in the plot. The top part of each spike is trimmed off to get rid of the awns and topmost spikelets, which are usually underdeveloped. The stalks are then inserted into the incision in the bung, and the cylinder firmly put on. The glass intake pipe is closed and the evacuation of air started. As soon as the spikes are immersed in the liquid, the tube is squeezed to interrupt the flow of the suspension, though the air continues to be evacuated until the rubber tube connecting the cylinder and the pump begins to contract. At the pressure attained the flowers were not damaged, but infection was very high. When the rubber tube contracts air is let into the cylinder, exerting a pressure on the spore suspension, so that the spores penetrate the flowers. The liquid is then drained into the bottle and the cylinder removed from the bung. The full process of infection lasts 1–1·5 min.

Enikeev (M. G.). Метод анаэробиоза в борьбе с **Ustilago tritici (Pers.) Jens.** [The anaerobiosis method for the control of *U. nuda*.]—Изв. Сибир. Отдел. Акад. Наук СССР. [*Izv. Sibir. Otdel. Akad. Nauk S.S.S.R.*], *1960*, 6, pp. 121–123, 1960.

At the Siberian sci. Res. Inst. Agric., Omsk, Caesium III wheat seed infected by *U. nuda* [cf. **39**, 298] was immersed in water in a 20 l. vessel with a ground glass stopper smeared with vaseline, heated to 32° C., and kept in a thermostat for 48 hr. at 28–32°, which is opt. for growth of the fungus. The seed was then dried, tested for germination, and sown in the field. Germination was 95% in 1958 and 91% in 1959. Strong, straight shoots developed, the plants were free from *U. nuda*, and yield was 22·3 and 20·4 centners ha. Anaerobic treatment is simpler and more economical than mono- and diphase heat treatments.

Polyakov (I. M.). Химический метод борьбы с пыльной головней Пшеницы и Ячменя. [Chemical method for the control of Wheat and Barley loose smut.]—Защ. Раст., Москва [*Zashch. Rast. Moskva*]. **5**, 3, pp. 15–18, 1960.

Rhodane (25% *p*-arhodaniline) is a more effective and less harmful seed treatment against wheat and barley smut [*U. nuda*: cf. above] than heat treatment. The effects may, however, be limited in some circumstances owing to variation in physiological maturity of the grain dependent on regional peculiarities, var., and sowing conditions. Lutescens 62 from the Ussuriisk (damp zone) was completely free from *U. nuda* following seed treatment with rhodane (untreated seed gave 15–20% infection). Similar seed from the Voronezh area was only completely free from infection when maturing in a damper yr. Hordeiforme on virgin soil is almost completely free from infection following seed treatment with rhodane, though Caesium, which matures more rapidly, is not. In physiologically ripe grain the smut is in the microsclerotial form and resistant to treatments. Seed damped with water and left wet for several hr. was more responsive to rhodane treatment. When dried at 60° for 90 min. after rhodane there was 100% inhibition of *U. nuda* in Lutescens 62 seed from the [Soviet] Far East and Krasnodar, Albidum from Novosibirsk, Akmolinka and Hordeiforme 189 from Kustanai, as against 11·3, 7·2, 3, 0·6, and 0·7% infection, respectively, in untreated seed. The opt. period for drying was 4 hr. at 60°: germination and subsequent growth were improved.

Mace (M. E.). **Naturally occurring quinones in Wheat and Barley and their toxicity to loose smut fungi.** *Diss. Abstr.*, **20**, 11, pp. 4237–4238, 1960.

At N. Carol. State Coll. Knox wheat and Colonial barley seed infected by loose smut (*Ustilago nuda*) [cf. **38**, 507] were soaked in water containing sulphydryl-type compounds known to inhibit naturally occurring quinones toxic to the fungus in the grain, but there was no significant interference with the control of loose smut achieved by the water soak method. Pure 2-methoxy- and 2,6-dimethoxy *p*-benzoquinones and 2-methoxyquinol were highly toxic to *U. nuda* spores and mycelium, particularly the first and last-mentioned. The compounds appear to be fungicidal rather than fungistatic and their toxicity may be partly attributable to their ability to combine with or oxidize essential sulphydryl groups in the spores. Spectrophotometric assay of extracts from affected wheat and barley indicated that 22·2–28·1% of the 2-methoxyquinol glucoside in wheat and barley germ disappeared during prolonged water-soaking, with the resultant formation of free 2-methoxyquinol. If this or its oxidation product 2-methoxy-*p*-benzoquinone were to accumulate in the germ in amounts equivalent to the decrease in 2 methoxyquinol glucoside during treatment, then the conc. would be far in excess of that required to kill the mycelium of *U. nuda in vitro*. However, paper chromatography of extracts of soaked wheat and barley seed did not disclose detectable amounts of the 3 substances.

Zemanek (I.) & Bartosh (P.). Новый способ протравливания семян Ячменя против пыльной головни. [A new method for treating Barley seed against loose smut.]—Меж. сел.-хоз. Ж. [*Mezh. sel.-khoz. Zh.*]. **4**, 3, pp. 81–89, 2 fig., 1960.

On the basis of experiments begun in 1955 at the Sci. res. Inst. for Plant Growing, Acad. agric. Sci., Ruzyně, Czechoslovakia, an anaerobic method is advocated for treatment against loose smut [*Ustilago nuda*: cf. **40**, 42 and above]. The seed is first steeped in clean water at 18–20° C. for 2–4 hr. or only wetted (20 l. 100 kg.). If infected by *Fusarium* sp., hard smut [*Tilletia caries*], or stripe [*Helminthosporium gramineum*], it may be steeped in 0·05% germisan for 2–4 hr. or damped with 0·5% germisan/l. water/centner seed. After being kept in hermetically sealed containers or bags at 21–22° C. for 4 days it is spread thinly on the floor and turned over periodically until normal humidity (12–14%) is obtained. The usual dry treatments can then be applied. Anaerobic treatment should take place just before sowing. In 1958, with heavily infected seed of 3 vars. (Val'titski, Opavski, and Triumph) in 4 localities with different climates and soils, the av. effectiveness was 98%. Practical application at 2 places in 1957, 8 in 1958, and 10 in 1959 confirmed the excellent results, and the method is recommended for wide use.

Kavanagh (T.) & Mumford (D. L.). **Modification and adaptation of Popp's technique to routine detection of Ustilago nuda (Jens.) Rostr. in Barley embryos.**—*Plant Dis. Reptr*, **44**, 7, p. 591, 1960.

At Dept Plant Path., Univ. Minn., St. Paul, Popp's method [**38**, 318] was adapted for testing large numbers of samples. Approx. 500 grains were autoclaved in solution A (equal parts v/v 6% NaOH and 24% Na silicate—0·4 ml. tween 20 l.) for 45 min. at 7 lb. The embryos were separated by sieving and floating off in conc. Na silicate (50 ml./200 ml. water) and autoclaved similarly in solution B (equal parts 24% ethanol and 30% NaOH). Following several washings in distilled water the embryos, in Gooch crucibles, were autoclaved successively (1 min. each) in solutions C (absolute ethanol: glacial acetic acid, 3:1), D (45% lactic acid), E (45% glacial acetic, 0·1% trypan blue), and D again. They were then transferred in water to a ridged tray and examined under a ×20 binocular microscope. An av. of 95% embryos was obtained for the final reading and a technician could test groups of 10 samples at 40 min./sample.

Cottingham (C.). **Inheritance of resistance to covered smut in several hybrids of Barley.**—*Diss. Abstr.*, **20**, 9, p. 3484, 1960.

Four non-commercial barley vars., Pannier, Odessa, Chevron, and Jet, were inoculated with race 6 of *Ustilago hordei* [**36**, 394] by the vacuum and hand-dehulled methods at Michigan State Univ. The inheritance of resistance was explained on the basis of 2 factor pairs, 1 of which governed the characters covered versus naked caryopses, and black v. blue aleurone in the cross Pannier × Jet.

Mathur (R. S.), Mathur (S. C.), Saksena (K. N.), & Verma (S. C.). **Resistance of Barley varieties against loose smut (Ustilago nuda (Jens.) Rostr.) and covered smut (Ustilago hordei (Pers.) Kellerm. and Swingle) in Uttar Pradesh.**—*Curr. Sci.*, **29**, 7, pp. 280–281, 1960.

In field tests at Kanpur, U.P., from 1953–1959 (results tabulated) none of the many vars. inoculated was uninfected by loose smut. The most tolerant (1–5% infection) were C 44, CN 292, CN 294, NP 13, C 50, and Black barley. No var. had more than moderate resistance (under 2% infection) to covered smut, C 50, K 18, CN 292, C 84, K 19, and Bajpur local being in this class.

Medler (J. T.) & Smith (P. W.). **Greenbug dispersal and distribution of Barley yellow dwarf virus in Wisconsin.**—*J. econ. Ent.*, **53**, 3, pp. 473–474, 1 map, 1960.

Heavy infestation of greenbug (*Toxoptera graminum*) in 1959 was associated with a high incidence of red leaf on oats (barley yellow dwarf virus) [**39**, 301], which was more prevalent in Wis. than for nearly a decade.

Wahl (I.). **Reaction of Oats endowed with the 'Canadian' factors for resistance to physiologic race 6 of Oat stem rust in Israel.**—*Canad. J. Pl. Sci.*, **40**, 3, pp. 447–451, 1960. [14 ref.]

During field and seedling tests in different regions of Israel from 1951–1959 [**38**, 363], oat vars. possessing 'Canadian' genes were highly resistant to *Puccinia graminis* f. sp. *avenae* race 6 [cf. **38**. 1]. Exposure to 29° C. during the incubation period rendered inoculated seedlings susceptible, though the same temp. before inoculation did not.

Benada (J.). **Vícebuněčné zimní výtrusy rzi travní—Puccinia graminis Pers.** [Multicellular teleutospores of black rust, *P. graminis*.]—*Čes. Mykol.*, **14**, 3, pp. 145–147, 2 fig., 1960. [Germ. summ.]

These were found by Inst. Cereal Res., Kroměříž, Czechoslovakia, on oat stalks and leaf sheaths, along with normal spores in some pustules and alone in others. Their dimensions reached or slightly surpassed the upper limit of the normal range (27–77 μ). The material (No. 135093) is preserved in the bot. Sec. Moravian-Silesian Museum, Brno.

Sadanaga (K.) & Simons (M. D.). **Transfer of crown rust resistance of diploid and tetraploid species to hexaploid Oats.**—*Agron. J.*, **52**, 5, pp. 285–288, 1960.

In further studies at Iowa State Coll., Ames, resistance of the diploid var. C.D. 3820 to *Puccinia coronata* [**38**, 688: **39**, 102] races 264, 276, and 290 [**39**, 407] has been transferred to 43- and 42-chromosome hexaploid types by using a derived tetraploid, C.I. 7232. Resistance of C.I. 3815, also diploid, and a tetraploid C.I. 7233 has been transferred to the 2nd and 3rd backcross generations.

Ivanoff (S. S.). **Differentiation of Oat Helminthosporia by the ragdoll method.**—*Plant Dis. Reptr*, **44**, 7, pp. 538–542, 1 fig., 1960.

At Miss. agric. exp. Sta. isolates of *H.* [*Cochliobolus*] *victoriae* completely disintegrated the radicles of susceptible oat vars. including Alamo, Arlington, and Victorgrain 48–93, after 5 days in the ragdoll at 28° C. and 100% R.H., but did not affect the coleoptiles [cf. **39**, 302]. Under the same conditions *H.* [*Pyrenophora*] *avenae* [**38**, 689] caused necrotic lesions on the coleoptile, rotting of the culm base, and black spots on the 1st true leaf after 10–12 days. None of the 29 isolates tested induced Victoria blight on the resistant vars. Mid-South, Southland, Delair, Nortex 107, or Delta Red 88, but all these and the 3 blight-susceptible vars. were attacked by *P. avenae*. These results were confirmed by inoculation in the greenhouse. Two isolates from culm rots [**39**, 302] were pathogenically similar to *P. avenae*.

Malone (J. P.). **Studies on seed health. II. The use of malt extract in the routine examination of seeds for health.**—*Proc. int. Seed Test. Ass.*, **24**, 2, pp. 179–183, 1 fig., 1959. [Received June 1960.]

The detection by the Ulster method [**36**, 442] of *Pyrenophora avenae* on seed oats involves the use of malt extract agar. The 5 brands of malt extract tested were satisfactory, but not liquid malt extract, on which the production of coremia is poor.

Van Hoof (H. A.). **Twee virus ziekten van Maïs in Suriname.** [Two virus diseases of Maize in Surinam.] —*Surinaam. Landb.*, **8**, 1, pp. 20–23, 1 fig., 1960. [Engl. summ.]

Maize stunt virus [**37**, 533] was found on maize and shown to be transmissible by *Dalbulus maidis*.

Maize mosaic virus [cf. **13**, 225; **39**, 75] occurred on *Rottboellia exaltata*, from which it was transmitted to the same host and maize by *Peregrinus maidis*. Since transmission from the grass or maize to maize was much less easy than from *R. exaltata* to the same host, the virus is presumed to be a str. of maize mosaic specially adapted to the grass.

Kobel (F.). **Die Getreideroste in der Schweiz.** [Cereal rusts in Switzerland.] —*Mitt. schweiz. Landw.*, **8**, 6, pp. 81–92, 6 fig., 1960.

This general survey from the Eidg. Landw. Versuchsanst., Zurich [**39**, 292], includes a short description of the symptoms of maize rust (*Puccinia sorghi*) [**29**, 20], which is not now of great importance in Switzerland.

Musiĭko (A. S.), Geshele (É. É.), & Val'ter (O. Yu.). О некоторых вопросах биологии возбудителя пузырчатой головни Кукурузы. [Some questions of the biology of the causal agent of blister smut of Maize.] *Agrobiologiya. Moscow, 1960*, 4 (124), pp. 579–582, 1960.

In the laboratory at the All-Union Inst. for Selection and Genetics, Odessa, U.S.S.R., 46·6% infection of maize plants was obtained from inoculation with dry and 80·2% with germinated spores of blister smut [*Ustilago maydis*] at room temp. and 45–50% R.H., compared with 42·9 and 69·1%, respectively, at 95–100% R.H. Basidiospores began to develop 8–10 hr. after chlamydospores had germinated, but were inhibited at 5–10° [C.]. Winter frosts (−13 to −20°) preserved the viability of spores both on the soil surface and at a depth of 10–15 cm. better than at lab. temp. Mechanical damage, due particularly to insects, favoured infection. Seedlings regularly exposed to natural light for only part of the day were more susceptible to inoculation, but there were varietal differences.

Salunskaya (Mme N. I.), Shkodenko (V. I.), Manannikova (Mme G. P.), Rogachev (V. L.), & Afonina (Mme A. P.). Опрыскивание Кукурузы препаратом ТМТД в борьбе с пузырчатой головней. [Spraying Maize with thiram for the control of blister smut.]—Кукуруза [*Kukuruza*], **5**, 6, pp. 36–37, 1960.

In 1959 at 4 regional agric. exp. sta. in the Ukraine maize plants were sprayed with a 2% thiram suspension (500 l. ha.) against blister smut [*Ustilago maydis*: cf. **39**, 23]. The best results were obtained with 2 sprayings 8–10 days before or at the beginning of panicle emergence, or with 4 sprayings from the 2–3 leaf stage to the beginning of panicle emergence. Spraying also increased yield from 10 to 20%. Further study is needed as the 1959 results are inconclusive, the spring of that year in the Ukraine being drawn out and cold, conditions unfavourable to the development of *U. maydis*.

Koehler (B.). **Cornstalk rots in Illinois.** —*Bull. Ill. agric. Exp. Sta.* 658, 90 pp., 26 fig., 1 graph, 1960. [111 ref.]

After descriptions of 10 diseases of maize occurring in Ill. [**36**, 184], of which *Diplodia zeae* [*D. maydis*] and *Gibberella zeae* are the most important, and a note on some other rots and infections, general methods of experimentation are described and the relative values of 5 methods of assessing stalk rot damage compared. Some data on the damage caused by stalk rots is followed by an account of the various factors influencing natural rot development. The points of entry into the stalks of

6 of the fungi concerned are noted and a section is devoted to artificially induced rots and the related procedure for testing resistance of new vars. There are finally some suggestions for reducing the damage caused by these diseases.

Orshanskaya (Mme V. N.). Обработка семян токсинами фитопатогенных грибов как метод отбора растений, устойчивых к грибным заболеваниям. [Seed treatment with toxins of phytopathogenic fungi as a method for selection of plants resistant to fungus diseases.] —*Agrobiology, Moscow, 1960*. 4 (124). pp. 573–578, 1960.

At the Central Lab. Quarantine agric. Plants, Min. Agric., U.S.S.R., filtrates from *Diplodia zeae* [*D. maydis*] cultures grown on a decoction of 200 g. maize seed l. water supplemented by 0·5 g. KCl, 0·5 g. $MgSO_4$, 1 g. K_2HPO_4, 2 g. $NaNO_3$, and 20 g. glucose or on a similar potato decoction were used undiluted and diluted at 1:10–1:10,000 for treatment of seed of Sterling (Krasnodar var.), Abashskaya zheltaya (Georgian), and No. 501 (American). After 72 hr. some seeds turned brown and ceased to germinate, others remained undamaged and developed small rootlets. Subsequently transferred to Kovrovtseva's medium (1 g. $MgSO_4$, 1 g. K_2HPO_4, 0·2 g. $Ca_3(PO_4)_2$, trace of $FeSO_4$, and 0·7% agar l. water) some seedlings reached the height of the control plants (22 cm.) within 10 days, their number being correlated with the degree of dilution of the filtrates used. Citrus seed treated with the filtrates of *Deuterophoma tracheiphila* [cf. **36**, 242] gave similar results.

Kalashnikov (K.). Комбинирани препарати за третиране семената на Царевицата. [Combined chemicals for Maize seed treatment.] —Раст. Защ. [*Rast. Zasht.*], **8**, 2, pp. 4–7, 1960.

At the All-Union Inst. Plant Prot., Leningrad, thiram—gamma-BHC, dieldrin, or heptachlor ensured about equal or, in particular cases, higher viability and green matter yield in vars. Odeska 10, Grushevska, and Krasnodarska 1 49 than granosan and mercuran (at 1·5 g./kg. seed).

Pidoplichko (M. M.), Moskovets' (V. S.), & Zhdanova (Mme N. M.). Вплив деяких грибів з ризосфери Кукурудзи на її проростки. [The effect on the shoots of some fungi from the Maize rhizosphere.] —*J. Microbiol., Kiev*, **22**, 3, pp. 15–20, 3 fig., 1960. [Russ. summ.]

At the Inst. Microbiol., Kiev, the most widespread fungi isolated from rhizosphere soil and soil washed from maize roots from the steppe and forest-steppe regions of the Ukraine were: *Mucor hiemalis* (especially in the W. regions) and *Fusarium*, *Aspergillus*, and *Penicillium* spp. Most frequently found on the surface of the roots were: *Haplaria* sp., *Periconia macrospinosa*, as well as *F. oxysporum* var. *orthoceras* [*F. orthoceras*], *F. gibbosum*, *Chaetomium comatum*, *Stysanus stemonitis*, *Helminthosporium bondarsevi*, *A. niger*, *Penicillium rugulosum*, and *P. janthinellum*. Of 49 cultures tested, 36 stimulated the germination of maize seed and shoot growth, *F. gibbosum*, *F. semitectum*, *F. sambucinum*, *Spicaria violacea*, *P. nigricans*, *P. rugulosum* (rhizosphere and roots), *Fusidium viride*, and *Botrytis* sp. being the most effective.

Moskovets' (V. S.) & Zhdanova (Mme N. M.). Кількісний та родовой склад грибної флори ризосфери Кукурудзи в деяких областях степу і лісостепу УРСР. [The quantitative and generic composition of the fungus flora of the rhizosphere of Maize in some regions of the steppe and forest-steppe of the Ukrainian S.S.R.] —*J. Microbiol., Kiev*, **22**, 3, pp. 21–26, 1960. [Russ. summ.]

In further studies in 1957–58 [see above] of maize rhizospheres from 6 Ukrainian steppe and 5 forest-steppe regions, soil from roots was found to be richer in fungi than soil without plants. Soil washed from maize roots contained the most fungi,

and the numbers of colonies in washings from depths of 25–30 cm. and 45–50 cm. were 1·7–4 and 3–4·4 times greater, respectively, than from corresponding rhizosphere soil. Soil samples from the Drogobȳch, Stanislav, Kirovograd, and L'vov regions had the greatest range of fungi. In the first washing of soil from roots at all depths *Penicillium* predominated, followed by *Fusarium*, then pale hyphomycetes.

KHRUSHCHEVA (Mme E. P.). Условия, благоприятствующие образованию микоризы Кукурузы. [Conditions favouring formation of Maize mycorrhiza.] – *Agrobiology, Moscow*, *1960*, 4 (124), pp. 588–593, 1960.

At Gor'kiĭ agric. Inst., U.S.S.R., 60% soil humidity proved most suitable for the formation of mycorrhiza in the var. Voronezhskaya 76; at 85% plants grew well but mycorrhiza developed feebly, and 30% was unfavourable for both plants and mycorrhiza. Aeration of soil, as by superficial tilling, had a stimulating effect, as had the introduction of mulch, alone or in combination with organo-mineral fertilizers. Of these superphosphate dust at 50 kg. ha.—mulch was most effective, but at 200 kg./ha. applied to planting holes it reduced the mycorrhiza and had none or a negative influence on yield.

MARTINEZ (A. L.), BERGONIA (H. T.), ESCOBER (J. T.). & CASTILLO (B. S.). **Mosaic of Rice in the Philippines.**—*F.A.O. Plant Prot. Bull.*, **8**, 7, pp. 77–78, 1 fig., 1960.

In Feb. 1960, 8–10% of Leuang Yai rice plants in the experimental field of the Bureau of Plant Industry, Manila, were infected by a mosaic, which did not resemble any other known virus disease of rice, though it was similar to mosaic diseases described on other gramineous plants in Puerto Rico, Tunisia, and S. America. The foliar mottling was composed of lesions varying from dots to long chlorotic streaks. The plants were stunted and produced only a small number of tillers. Symptoms were transmitted to Cuban Yellow flint maize seedlings by abrasion and by pin prick [**36**, 320]. On unfolded leaves pale green streaks which developed into a very mild mosaic that became masked with maturity were produced.

DEIGHTON (F. C.) & SHAW (DOROTHY). **White leaf-streak of Rice caused by Ramularia oryzae sp. nov.**—*Trans. Brit. mycol. Soc.*, **43**, 3, pp. 516–518, 1 pl. (2 fig.), 1 fig., 1960.

This leaf spot of rice, which has been found in Papua and New Guinea, British Solomon Islands Protectorate, N. Borneo, Sierra Leone, and Nigeria, is described. The causal fungus, *R. oryzae* Deighton & Shaw, has hyaline, 0–3 (mostly 1-) septate conidia, 15–40 × 2·5–4·75 μ.

TABEI (H.) & MUKOO (H.). **Anatomical studies of Rice plant leaves affected with bacterial leaf blight, in particular reference to the structure of water exudation system.**—*Bull. nat. Inst. agric. Sci., Tokyo*, Ser. C, *1960*, 11, pp. 37–43, 11 pl., 1960. [Jap. Abs. from Engl. summ.]

The water exudation system of the rice plant, described in detail, consists of adaxial water pores [hydathodes] and the epitheme connecting the pores to the vascular system by openings (vascular passes). *Xanthomonas oryzae* [**39**, 103] invades the leaves through the pores and multiplies within the epitheme, proliferation being greater the farther the 'passes' are from the point of entry. The bacteria subsequently move into the vessel and the epitheme becomes filled with bacterial zooglea, from which bacterial ooze passes from the hydathodes.

TAKAHASHI (J.). **Review of investigations on physiological diseases of Rice. I and II.**—*News Lett. int. Rice Comm.*, **9**, 1, pp. 1–6; 2, pp. 17–24, 1960.

The similar physiological diseases of rice reported from various Asian countries

under different names, 'amyit-po' (Burma) [**36**, 57], 'bronzing' (Ceylon) [**37**, 658], 'mentek' (Indonesia) [**35**, 542], 'akagare' (Japan) [**37**, 475], 'stifle' (Korea), 'penyakit merah' (Malaya) [**38**, 81], and 'pansuk' (Pakistan) [**37**, 352], all occur when the plants are under stagnant water at tillering. A similar type of disorder has also been reported from Thailand. Certain relevant environmental factors and morphological features of the rice root are outlined and the diseases discussed in the light of these. It is concluded that, with the exception of the diseases in Thailand and Cambodia, which require further study, and 'amyit-po' in Burma, all those mentioned are related to high reducing conditions in the soil. Injurious substances may include ferrous Fe, H_2S, butyric acid, formic acid, etc. [cf. **39**, 308]. All these disorders are prevented or reduced in severity by improving the drainage conditions.

In the second paper brief descriptions of symptoms, soil and weather conditions, times of appearance, varietal reactions, possible losses, and control measures for diseases of this nature in different countries are presented. In addition to the above they include 'miyit-po' and 'yellow leaf' in Burma [**36**, 57], 'akiochi' [**39**, 307 *et passim*], 'aodachi', 'aogare', and 'hideri-aodachi' in Japan, 'chin-sng-tsan' in Formosa, and 'straight head' in the U.S.A. [**39**, 574].

Pantastico (E. B.). **Black spots on the leaves and grains of Rice plants.**—*Philipp. Agric.*, **43**, 9, pp. 583–585, 2 fig., 1960.

The black spots, from which no pathogenic organism could be isolated, started at the tips and spread downwards along the margins of leaves of plants grown in culture solutions [at Dept Agric.]. In severe attacks large necrotic areas developed and the leaves dried up. Symptoms first appear when the plants are about 45 days old. Grains become spotted at the tips 1 week after flower emergence, but only the hulls were affected. Some vars. were more severely spotted than others. Symptoms were favoured by high levels of N and diminished by adding Na silicate to the solutions.

Wallace (J. M.) & Drake (R. J.). **Woody galls on Citrus associated with vein enation virus infection.** *Plant Dis. Reptr.* **44**, 7, pp. 580–584, 3 fig., 1960.

Inoculations at the Univ. Calif. Citrus Exp. Sta., Riverside, indicated that the woody galls produced on stems of rough lemon and Mexican lime were caused by citrus vein enation virus [**32**, 622; cf. **39**, 576].

Klotz (L. J.) & DeWolfe (T. A.). **The production and use of zoospore suspensions of Phytophthora spp. for investigations on diseases of Citrus.**—*Plant Dis. Reptr*, **44**, 7, pp. 572–573, 1960.

At Univ. Calif. Citrus Exp. Sta., Riverside, *P. citrophthora* and *P. parasitica* [**39**, 704] were cultured on autoclaved lucerne stems to obtain abundant mycelium (4–5 days at 26° C.); the stems were then placed on a piece of cloth over a jar and washed with water, aerated by falling from a height of 1–2 ft., for 18–24 hr., then kept for 48 hr. in a moist chamber, sporangia being produced in profusion by *P. citrophthora* at 22–25° and by *P. parasitica* at 25–27°. Zoospores discharged on transferring the stems to aerated water at 16–18° (*P. citrophthora*) or 23–24° (*P. parasitica*).

The suspensions are used to inoculate fruit sprayed with test fungicides, or to estimate the rot resistance of fibrous roots of rootstock vars. [**38**, 258].

Cohen (M.) & Knorr (L. C.). **Winter outbreaks of Citrus brown rot in Florida.**—*Plant Dis. Reptr*, **44**, 7, pp. 578–579, 1960.

Brown rot caused by *Phytophthora parasitica* [see above] has occurred annually on various citrus fruits since 1954 in late summer. In the late winter of 1959 and 1960, however, leaves and shoots also of grapefruit and Valencia orange were

attacked by a *P.* sp. which failed to sporulate in pure culture and is as yet unidentified.

KNORR (L. C.) & MALAGUTI (G.). **Halo scab—result of an association of Elsinoe fawcetti and Brevipalpus phoenicis destructive to sour Orange seedlings.** —*Plant Dis. Reptr*, **44**, 8, pp. 662–663, 2 fig., 1960.

Sour orange seedlings in a nursery at Maracay, Estado Aragua, Venezuela, were attacked by scab (*E. fawcettii*) and mite (*B. phoenicis*), which caused such severe defoliation that many of the plants died. It appeared that the scabs served as anchorages for the mites and as suitable egg-laying sites, causing yellow haloes 2–5 mm. wide round each scab lesion.

HAYWARD (F. W.) & GRIERSON (W.). **Effects of treatment conditions on o-phenylphenol residues in Oranges.** —*J. agric. Fd Chem.*, **8**, 4, pp. 308–310, 4 graphs, 1960.

Dowicide A, used in conjunction with the hydro-cooling process against citrus fruit decay [*Penicillium*, etc.: cf. **40**, 47], tends to injure the peel. At the Citrus Exp. Sta., Univ. Fla, Lake Alred, residues on Pineapple and Valencia oranges increased with rising concs., temp., and prolongation of treatment but decreased as the pH was raised. As a result of the investigations the authors recommend a 30-min. treatment at 40° F. with 0·1% dowicide A at pH 10·5, which leaves a residue of 4 p.p.m., though actually peel injury was not a problem where residues were below the legal tolerance of 10 p.p.m.

NUTMAN (F. J.), ROBERTS (F[LORENCE] M.), & BOCK (K. R.). **Method of uredospore dispersal of the Coffee leaf-rust fungus, Hemileia vastatrix.**—*Trans. Brit. mycol. Soc.*, **43**, 3, pp. 509–515, 2 pl. (12 fig.), 1960.

A more detailed account from the Coffee Berry Disease Res. Unit, Dept Agric., Nairobi, Kenya, of information already noticed [**39**, 311]. It is concluded that the periodic build-up of epidemics is due to the mutual adhesion of the spores being broken down and these subsequently dispersed by rain splash rather than by wind [cf. **39**, 579]. It is suggested that the pathogen would be controlled more economically and successfully by the elimination of inoculum at a specific time (during periodic low levels of infection) rather than by attempting the prevention of infection over a long period.

SNYDER (W. C.), TRUJILLO (E. E.), MCONIE (K. C.), & BERGER (C. A.). **Trunk and branch canker of Coffee trees in Guatemala.**—*Plant Dis. Reptr*, **44**, 7, pp. 566–567, 1960.

This disease, responsible for serious losses in humid, upland plantings in W. Guatemala, was confirmed to be due to *Ceratocystis fimbriata* [**31**, 237] in isolation and inoculation experiments at the Dept Plant Path., Univ. Calif., Berkeley, and in Guatemala. *Nectria* sp. associated with the cankers [**25**, 33] is a saprophyte.

SWAMINATHAN (B.), RANGA SETTY (H. T.), & PARTHASARATHY (S.). **Studies on 'berry blotch' disease of Coffee.**—*Indian Coffee* (*Mon. Bull. Indian Coffee Bd*), **24**, 6, pp. 246–250, 3 fig., 1960.

In S. India since 1957, and recently particularly in Coorg and Mysore, up to 33% coffee berries have been affected by dark brown shrivelled blotches, first apparent in Aug. and most severe by Dec. The 1st symptom is a small dark brown spot on the exposed upper surface of the berry, which enlarges to cover half or more of the surface; it later turns black and shrivels. In conditions of high humidity a greyish, fluffy growth of *Cercospora* sp. appears on the blotches.

The disease is most severe under poor shade conditions, and coffee vars. differ in their resistance. Best control was given by 2% Bordeaux mixture.

Ananth (K. C.), George (K. V.), Narasimhaswamy (R. L.), & Chokkanna (N. G.). **Die-back of Coffee—outlook and observations.**—*Indian Coffee* (*Mon. Bull. Indian Coffee Bd*), **24**, 6, pp. 238–245, 1960. [14 ref.]

Following a review of the literature on coffee die-back in Africa [**34**, 34; **35**, 276] and India [**35**, 765], 5 forms are distinguished in India. In Jan.–March it may occur on branches which have borne a heavy crop; from Sept. to Oct. on branches bearing the maturing crop, preceded by defoliation due to leaf disease or competition with the crop, which may fail to mature; in Nov.–Feb. a die-back follows premature leaf fall caused by severe attacks of leaf diseases; from July to Sept. it may be caused by excessive soil moisture; or from Feb. to April by excessive heat. In addition to these familiar occurrences, a few plantations in Mysore State have recently been affected by a 'die-back complex' noticeable during hot, dry weather and after the first summer showers. Symptoms include scorching of apical leaves on tertiary branches, defoliation at the nodes followed by a black scar, and blackening of the petioles of the functional leaves. These effects are intensified by over-cropping and lack of sufficient shade. Die-back is reduced by improved cultivation, maintenance of suitable shade, and properly spaced application of fertilizers.

Outbreaks and new records.—*F.A.O. Plant Prot. Bull.*, **8**, 6, pp. 70–71, 1 fig., 1960.

From Fac. Agric., Univ. Alexandria, I. A. Ibrahim & M. K. Abo-el-Dahab record the occurrence of cotton leaf curl virus [map 25] in Egypt. The disease first appeared in 1957 and by 1958 almost all the cotton fields in the Behara Province were affected.

Malinin (V. M.) & Toropova (Mme L. V.). К вопросу о вилтоустойчивости сортов Хлопчатника. [Concerning wilt resistance of Cotton varieties.]—Хлопководство [*Khlopkovodstvo*], **10**, 6, pp. 37–38, 1 graph, 1960.

In 1959 at the Izbaskent entomo-phytological Division, 53 cotton vars. on the State varietal list were tested for resistance to *Verticillium dahliae* [**39**, 25]. Only 152-F was significantly more resistant than the standard 108-F [cf. below], 144-F and KR-2 were slightly more resistant, and 12 vars. were approx. equal to the standard.

Voïtenok (F. V.). Особенности селекции Хлопчатника на вилтоустойчивость. [Features of Cotton selection for wilt resistance.] Хлопководство [*Khlopkovodstvo*], **10**, 7, pp. 35–37, 1 graph, 1960.

Gossypium hirsutum vars. only differ in their susceptibility to *Verticillium* wilt [*V. dahliae*: see above], none are immune. The later the infection the less effect it has on yield and quality, and the more highly resistant the var. appears. Comparatively resistant vars. are 108-F, 152-F, S-1427, and Osh-11. To determine whether uninfected plants were more resistant to *V. dahliae* than those in which symptoms appeared at the end of the growing period, healthy plants and plants which contracted slight infection early were selected at the Inst. for Cotton Selection and Seed-breeding at the end of the 1958 season from highly infected material in different F_1 hybrid families. In 1959 seed from these was sown in adjacent rows in an infested plot. Resistance of the progeny from the mildly infected plants was in the majority of cases (42 out of 76) higher than that from healthy plants, 64·6% of the plants from healthy F_1 being infected as against 61·4% from mildly infected. It is preferable to select from infected material on the basis of the progeny, rather than by individual plants, and from the most productive healthy plants in the F_2. In 1959 infection in the F_5, selected in the F_3 and F_4, was 56·2–70·6% as against 75·3% in the standard 108-F. It was concluded that selection for resistance should in the

main be made on the basis of comparative assessment of resistance of family and lower groups, not on that of individual plants, since the peculiarity of the appearance of *Verticillium* wilt in cotton makes it impossible to determine exactly the resistance of individual plants to *V. dahliae*.

MEYER (J.). **La flétrissure fusarienne du Cotonnier. I. Facteurs qui interviennent dans l'incidence de la flétrissure.** [Fusarial wilt of Cotton. I. Factors which intervene in the incidence of wilt.] *Agricultura, Louvain*, Sér. 2, **8**, 2, pp. 203–218, 2 fig., 1960. [Flem., Engl. summ. 38 ref.]

Sporadic infection of cotton by *Fusarium oxysporum* f. *vasinfectum* has been found in both the N. and S. of the Congo [**34**, 583], where it is combated by the use of resistant vars., e.g. Stoneville and Bambesa 49. From a study in 1958 of the influence of various environmental factors on the incidence of wilt the author concludes that 1 of the following is always concerned: abnormally abundant infective material, associated attack by root-knot nematodes, notably *Meloidogyne incognita* [cf. **39**, 580], or K deficiency.

Using the suspension and dilution technique, some 5,000 spores g. soil were isolated from 3 foci of diseased plants. Natural K deficiency is stated to be non-existent as yet in the Congo, but on a termite nest, the organic horizon of which had been removed by erosion, large numbers of plants showed a combination of wilt and K-deficiency symptoms: chemical analyses gave 0·52% K in the leaves of diseased plants and 2·5 in the healthy, thus confirming the latter.

CIOCAN (C.) & CALNEGRU (I.). **Gossypium hirsutum L. var. Odesse 1, nouvel hôte pour le Pythium debaryanum Hesse en Roumanie.** [*G. hirsutum* var. Odessa 1, a new host of *P. debaryanum* in Romania.]—*Rev. Mycol., Paris*, **25**, 1, pp. 49–51, 1960. [9 ref.]

In June 1959, potted cotton plants in a greenhouse in Bucharest wilted and died as a result of *P. debaryanum* infection.

VAN PARIJS (R.). **Parasitaire schimmels op Vlas.** [Parasitic fungi on Flax.] – *Verh. Rijkssta. PlZietk. Gent* 5, 30 pp., 4 fig., [? 1960. Fr., Engl. summ.]

A list is given of the fungi isolated from dead flax stems in Belgium, followed by comprehensive information (much of it already published) on the most important parasitic spp., placed into 2 groups according to whether they were in soil or seed: (1) *Pythium megalacanthum* [**35**, 296] and other *P.* spp., e.g. *P. debaryanum* and *P. irregulare* (causing damping-off); *Phoma exigua*, *P. herbarum*, *P. lini*, and *P. linicola* (foot rot); *Fusarium lini* (wilt); *F.* spp. acting as the secondary parasites, e.g. *F. culmorum* and *F. oxysporum*; and *Melampsora lini*: (2) comprises *Alternaria* sp., *Botrytis cinerea*, and *Colletotrichum linicola* [**38**, 408].

On 2 mineral media, supplemented by either 20 g. glucose or an equal quantity of methylcellulose/l. water and 15 g. agar, the opt. temp. for the growth of group (2) was 20° C. At 30° the development of *B. cinerea* was greatly reduced, as was that of *C. linicola* at 35°, while *A.* sp. continued to grow at 35°. At 7° growth of *C. linicola* was almost nil, that of *A.* sp. was slowed, and of *B. cinerea* abundant. At 35° on glucose *C. linicola* was vivid orange, at 20° red-brown, and at 12° green, while *A.* sp. also varied between brown and green according to the temp. *B. cinerea* was typically grey plush at all temps. Methylcellulose permitted only a min. production of mycelium and the white to grey colour was similar in all spp.

On a medium enriched with various other C sources, all of which except salicin promoted regular growth of *C. linicola*, the microscopic appearance of the mycelium was aberrant on some. Only *Trichoderma viride* [*T. lignorum*], of a number of soil fungi tested, exerted a powerful antagonism to *C. linicola* at pH 6·8, 5·8, and 4·2.

Mirolyubov (K. S.). Исследование устойчивости Льна к **Melampsora lini.** [Investigation of resistance in Flax to *M. lini*.]—*Agrobiology, Moscow, 1960*, 4 (24), pp. 620–622, 1960.

At Leningrad agric. Inst. and Inst. Flax, Torzhok, U.S.S.R., soil in which flax seedlings were growing was inoculated by inserting 3 cm. stalk cuttings bearing teleutospores of *M. lini* [cf. **36**, 187] 1 cm. from the plants. Infection by uredospores took place mainly during flowering, independently of season; if this period was delayed (for instance by 8 hr. exposure to daylight), resistance was enhanced.

Baxter (G. D.). **The control of Jute pests and diseases in British Guiana.**—*Trop. Sci.*, **2**, 1–2, pp. 36–43, 4 pl., 1960.

In the section on diseases (pp. 42–43) it is noted that only 3 fungi of importance occur, viz. *Diplodia corchori* [**35**, 750], *Macrophomina phaseoli* [cf. **23**, 107; **38**, 568], and *Macrophoma corchori* [? = *Macrophomina phaseoli*: **4**, 349]. *D. corchori* seldom infects more than 3–5% of the plants; the 2 other pathogens are also sporadic, but may affect some 30% of the crop on clay soil. Factors tending to waterlogging or K deficiency should be eliminated and seed treated with agrosan GN at $5\frac{1}{2}$ oz./cwt.

Chatterji (B. C.) & Basu (S. N.). **Pectic enzymes secreted by fungi and their action on Jute bark.**—*J. sci. industr. Res.*, **19**, Sect. C, 7, pp. 162–167, 1960.

The effect on the viscosity of apple pectin solution of the filtrates of 92 fungi grown on a pectin medium was used as a test for polygalacturonase in studies at the Microbiol. Sect., Indian Jute Mills Res. Inst., Calcutta. No relation between mycelial growth and enzyme production was detected. The most potent enzymes were produced by *Penicillium* spp. and the most favourable N sources were $(NH_4)_2SO_4$ and NH_4NO_3. Pectin from jute cuttings was more resistant than apple pectin. Protopectinase seemed to be the most potent enzyme softening green jute bark, but dry cuttings did not give the same reaction. Evidence was obtained that the pectin in jute bark was altered by drying.

Malaguti (G.). **Epifitias de 'marchitez' por Fusarium en Ajonjoli.** [Epiphytotics of *Fusarium* 'wilt' in Sesame.] *Agron. trop., Maracay*, **8**, 4, pp. 145–150, 5 fig., 1959. [Engl. summ. Received 1960.]

A 1st report for Venezuela of a sesame wilt caused by *Fusarium* sp. [cf. **32**, 591], with symptoms similar to those of such wilts in other plants. Incidence was related to ambient conditions, the disease occurring when the water content of the soil was 17–27% of the dry wt. Nematodes, high air temps. by day and low by night, and high soil temps. to a depth of 5–10 cm. during dry periods increase its incidence.

Fletcher (J. T.) & Hawkins (J. H.). **Violet root rot on Alstroemeria.**—*Plant Path.*, **9**, 2, p. 76, 1 fig., 1960.

Roots of *A. aurantiaca* infected by *Helicobasidium purpureum* were recorded from Holland, Lincs., a new host record.

Tramier (R.). **Un mildiou nouveau de l'Anémone des fleuristes dans la région méditerranéenne.** [A new mildew of garden Anemone in the Mediterranean area.]—*C. R. Acad. Agric. Fr.*, **46**, 10, pp. 622–624, 1960.

Anemone coronaria crops in the departments of Var and the Alpes-Maritimes, France, have been widely attacked by *Peronospora anemones* Tramier [without a Latin diagnosis]. In dry, relatively cold weather the disease makes little progress, but when the min. temps. rise above 7–9° [C.] the mycelium resumes spread, the leaf tips rapidly drying up. If the disease is severe and of long standing leaf development is much reduced, the flower stalks remain short, and the flowers sometimes abort.

The mycelium in the parenchymatous tissues is 4–6 μ diam., non-septate, intercellular, and has conspicuously digitate haustoria. The conidiophores, 220–450 μ long, are branched in the middle, the final branches terminating in 2 sterigmata 10–20 μ long. The ovoid conidia measure 20·1–28·8 / 16·6–2·36 [? 23·6] (av. 24·6 × 19·8) μ. Numerous oospores, 27–44 μ diam., are formed. Because the spore measurements differed from those of *Peronospora ficariae* [cf. **29**, 305; **38**, 238] a n.sp. is suggested.

Khristova (Eleonora) & Aleksandrova (Iordanka). Болести и неприятели по Карамфила и средства за борба с тях. [Diseases and pests of Carnation and means of their control.]—Овощарство [*Ovoshtarstvo*], **7**, 7, pp. 32–38, 7 fig., 1960.

A review [cf. **39**, 472] from Inst. Plant Prot., Sofia, in which the section on physiological diseases includes 'flower-crack', characterized by broader and shorter calices than normal (control: soil dressing with superphosphate), leaf-roll (control: growing in lighted hot-houses in winter), 'oversleeping' or drying out of buds, bud-rot, stalk and flower deformation resulting from B deficiency (control: soil dressing with borax at 1–2 kg./dekar), and some other disorders caused by N, P, and K deficiency. Under virus diseases a note is given on [carnation] mosaic [virus] and general viral deformation and also on streak [aster yellows virus str.] and yellows (both absent from Bulgaria), the latter maintained to be a combination of streak and mosaic.

The most widespread fungus disease is 'cock's-eye' (*Heterosporium echinulatum*) [*Didymellina dianthi*], to control which 1% Bordeaux mixture is recommended on the first appearance of symptoms, repeated at 7–14 days intervals. Rust (*Uromyces dianthi*) is best controlled by dusting every 10–14 days with S or zineb—S, or by spraying with orthocide at 200 g./100 l., which is also effective against *Alternaria dianthi* rot, whereas control of *Fusarium* rot of buds (*F. poae*) may be secured by action against its symbiotic vector *Pediculopsis graminum*. Germisan, ceresan, and other mercurials at 250 g./100 l. are recommended against *Rhizoctonia* spp. Flower rot (*Botrytis* spp.) and root and stalk rot (*F.* spp.) can be well controlled by various phytosanitary techniques, which also serve to check some of the other diseases noted.

Hellmers (E.). **Nellikens rodhalsfusariose, stabfusariose og hvidkarfusariose som åreager til nedvisning af drivhusnelliker.** [Root-collar, stub, and white-vessel fusarioses of Carnation as causes of wilt of hot-house Carnations.]—*Horticultura*, **14**, 6–7, pp. 89–128, 15 fig., 1960. [Engl. summ. 100 ref.]

An extended account is given of that part of the author's studies already reported [**37**, 481] dealing with the forms of wilt caused by *Fusarium* spp. in Denmark. Infection of both the root-collar and apical internode or 'stub' is due to *F. culmorum*, while white-vessel wilt is attributed to *F. oxysporum* f. *dianthi*. *F.* spp., hitherto regarded as the principal agents of the disease, caused only 10·2% infection, while 54·4% was induced by *Phialophora* [*Verticillium*] *cinerescens* [**38**, 389] and 27·2% by bacteria, mainly *Pectobacterium parthenii* var. *dianthicola* [**39**, 316].

McFadden (L. A.) & Creager (D. B.). **Recent occurrence of bacterial blight of Poinsettia in Florida.** –*Plant Dis. Reptr*, **44**, 7, pp. 568–571, 1 fig., 1 map, 1960.

In 1958 a new and serious disease of *Euphorbia pulcherrima* in Fla [**39**, 79] was found to be caused by *Corynebacterium poinsettiae* [cf. **37**, 71]. When diseased stock plants are cut back and maintained in the nursery new growth may appear symptomless for 1 to 12 months. No disease occurred after 6 months in infected plants sprayed weekly with agrimycin 500 (4 lb./100 gal.).

Jackson (C. R.). **Crown rots and Botrytis flower blight of Statice.**—*Plant Dis. Reptr*, **44**, 8, pp. 643–645, 2 fig., 1960.

Several serious diseases are newly reported on *Limonium sinuatum* and *L. bonduellii* from the Gulf Coast Exp. Sta., Univ. Fla, Bradenton. Crown rots are caused by *Sclerotium rolfsii* and *Rhizoctonia* [*Corticium*] *solani*, both *L.* spp. being equally susceptible. For many years growers have also suffered losses from *Botrytis* flower blight (*B. cinerea*); *L. bonduellii* and most vars. of *L. sinuatum* are very susceptible but a lavender and a rose var. were slightly resistant.

Ostazeski (S. A.). **Studies on seed-borne brown spot fungus in white Lupine.**—Abs. in *Phytopathology*, **50**, 8 (1), p. 577, 1960.

Seed of white lupin plants heavily infected by *Pleiochaeta setosa* at Quincy, Fla [**39**, 76], was graded in 4 classes of increasingly severe discoloration; the pathogen was isolated from 4, 14, 32, and 60% respectively, and 2, 1, 5, and 20% diseased plants were produced in methyl bromide-fumigated soil. A presoak at 45° C. for 1 hr. followed by hot water treatment at 50° for 5–15 min. eliminated infection, as did hot air at 75° for 1–8 hr. soon after harvest, but the latter did not disinfect seed stored at 7° for over a yr.

Zummo (Natale) & Plakidas (A. G.). **Toxicity of PCNB to Magnolia fuscata.**—*Plant Dis. Reptr*, **44**, 7, p. 559, 1 fig., 1960.

Following application of terraclor to the foliage (10 g. gal.) or surrounding soil (200 lb. acre) leaf spotting and complete defoliation occurred in experiments at La State Univ., Baton Rouge.

Gäumann (E.), Nüesch (J.), & Rimpau (R. H.). **Weitere Untersuchungen über die chemischen Abwehrreaktionen der Orchideen.** [Further studies on the chemical defensive reactions in Orchids.]—*Phytopath. Z.*, **38**, 3, pp. 274–308, 7 fig., 1960. [Engl. summ.]

In further work at Eidg. Techn. Hochschule, Zürich [**39**, 586], all the 24 orchids from central and south Europe tested were capable of chemical anti-infectional defence reactions against their mycorrhizal fungi (*Rhizoctonia mucoroides*, *R. repens*, *R. versicolor*, *R. anomala*, *R. stahlii*, *R. asclerotica*, and *Orcheomyces* spp.). *Orchis militaris* responded with a 2nd, unknown, defensive substance in addition to orchinol. All the 19 mycorrhizal fungi isolated from European soil-inhabiting orchids can start up the production of the antibody, but of 24 saprophytic or semi-parasitic soil-fungi chosen at random none was capable of inducing orchinol synthesis. Three soil-inhabiting bacteria, which often occur in the superficial tissues of *O. militaris* bulbs, can also provoke its synthesis.

Dale (W. T.). **Rhododendron leaf spot in Britain.**—*Plant Path.*, **9**, 2, p. 76, 1 pl. (2 fig.), 1960.

Rhododendron leaves bearing lesions of *Cercospora handelii* [cf. **38**, 410 *et passim*] were received at Wye from a Surrey nursery in 1959. The disease was confined mainly to about ⅛ acre of 2-yr.-old plants; azaleas were not affected. The diseased foliage was removed and burnt in July–Aug. 1959, and there has been no recurrence. Among other places from which this disease has been reported are Australia, Belgium, Czechoslovakia, and U.S.S.R.

Göttgens (E.). **Untersuchungen über die Entwicklung von Exobasidium Azaleae Peck. und seine Infektion der Wirtspflanzen unter besonderer Berücksichtigung der gallenbildenden Wirkstoffe.** [Studies on the development of *E. azaleae* and its infection of the host plants, with particular reference to substances

stimulating gall formation.] —*Phytopath. Z.*, **38**, 4, pp. 394–426, 10 fig., 1960. [Engl. summ.]

At the Botanisches Inst. der Technischen Hochschule, Aachen, Germany, *E. azaleae* [**38**, 431] was cultured on a full synthetic nutrient medium from basidiospores and bud spores, transferred from mature galls. The fungus can be maintained in culture unchanged provided it is transferred regularly to new solutions. This has been done at intervals of 30 days over the last 3 yr. In these solutions the fungus is mostly in the form of bud spores and has a rough to fine mycelium, which often breaks up again into short rod-like bud spores. Infections were made on very young *Azalea* [*Rhododendron*] *indica* leaflets with spores kept in culture for 2 yr. From extensive experiments the conclusion is drawn that *m*-inositol and biotin, together with other specific stimulant substances, probably take part in gall formation on the leaves of *R. indica*.

Graves (C. H.) & Ashley (T. E.). **Thiram for Azalea petal blight control.**—Abs. in *Phytopathology*, **50**, 8 (1), p. 576, 1960.

Of the materials tested over 2 yr. against *Ovulinia azaleae* on Formosa azalea plants [*Rhododendron*: **39**, 711] in field plots in S. Miss. thylate (1 lb. 100 gal.) and a mixture of dithane D-14 (1⅓ qt.), $ZnSO_4$ (1 lb.), lime (½ lb.), and triton B-1956 (1 fl. oz.) proved best but thylate gave longer protection, was less phytotoxic, and left less visible residue on the flowers.

Schmelzer (K.) & Schmidt (H. O.). **Untersuchungen über eine Mosaikkrankheit an Viburnum opulus L.** [Studies on a mosaic disease of *V. opulus*.]—*Phytopath. Z.*, **38**, 4, pp. 427–430, 2 fig., 1960.

The disease, characterized by dappling of the leaves, was transmitted at the Inst. für Phytopath., Aschersleben, Berlin, by grafting and by *Myzus persicae*. It was retransmitted by abrasion from petunia plants to 16 plant vars. representing 7 families and appears to be caused by an as yet unidentified virus.

Novikova (Mme N. D.). Некоторые особенности физиологии Подсолнечника, пораженного ложной мучнистой росой. [Some peculiarities of the physiology of Sunflower infected by false mildew.]—Науч. Докл. высш. Школ. [*Nauch. Dokl. vÿssh. Shkol.*], biol. Sci., *1960*, 3, pp. 154–159, 2 graphs, 1960.

In further studies [cf. **39**, 320] it was concluded that tissue destruction or inhibition of growth of sunflower infected by *Plasmopara halstedii* is due to profound disturbances in the plant's water régime. The metabolic products of the parasite, such as toxins, enzymes, and highly active substances of the hormone type, severely disrupt host metabolism and engender changes in the properties of the protoplasm, especially changes in the water permeability of the surface layers, reducing the water retention capacity. This sharply increases transpiration, a considerable liberation of water taking place even when the plants are hampered in obtaining water.

Lukens (R. J.) & Stoddard (E. M.). **Control of stripe smut on Poa pratensis with nabam.**—*Plant Dis. Reptr*, **44**, 8, p. 672, 1960.

At the Conn. agric. Exp. Sta., New Haven, either an autumn or a spring soil drench of 1:400 22% nabam controlled stripe smut (*Ustilago striiformis*) [cf. **38**, 523] on Kentucky blue grass (*P. pratensis*) turf.

Vestad (R.). **The effect of induced autotetraploidy on resistance to Clover rot (Sclerotinia trifoliorum Erikss.) in Red Clover.**—*Euphytica*, **9**, 1, pp. 35–38, 1960. [Dutch summ.]

At the Inst. Genetics Plant Breeding, agric. Coll. Norway, Vollebekk, when diploid

and corresponding autotetraploid families of red clover, obtained from colchicine-induced chimaeras (plants with diploid and tetraploid shoots), were inoculated with *Sclerotinia trifoliorum* by Frandsen's method [**27**, 365] the latter proved more resistant. Significant interaction between family pairs and ploidy level was demonstrated, and this is an indication that there may be differences between different genotypes with respect to the effect of autotetraploidy on resistance in red clover [cf. **39**, 371].

Graham (J. H.) & Newton (R. C.). **Relationship between injury by the Clover root curculio and incidence of Fusarium root rot in Ladino White Clover.**—*Plant Dis. Reptr*, **44**, 7, pp. 534–535, 1960.

Further greenhouse studies at Univ. Park, Pa, suggested a relationship between injury, both mechanical and that caused by *Sitona hispidula* larvae, and increased incidence of *Fusarium* root rot [**39**, 322].

Kilpatrick (R. A.). **Heat-induced stolon rot of Ladino White Clover in the greenhouse.**—*Plant Dis. Reptr*, **44**, 8, pp. 653–654, 1 fig., 1960.

Injury induced at N. Hamp. agric. Exp. Sta., Durham, in stolons of Ladino white clover by exposure to 20°–53° C. for 10 min. was comparable to that found in the field. Soil temps. of 30°–40° occur during summer in N. Hamp., and the max. R.H. for Apr.–Oct. is 96–100%. When the injured test plants were placed in a moist chamber a complex of soil-borne fungi caused stolon rots similar to those encountered in the field.

Houston (B. R.), Erwin (D. C.), Stanford (E. H.), Allen (M. W.), Hall (D. H.), & Paulus (A. O.). **Diseases of Alfalfa in California.**—*Circ. Calif. agric. Ext. Serv.* 485, 20 pp., 17 fig. (9 col.), 1960.

This publication describes the 16 most important and 4 minor diseases of lucerne, together with 'scald' [**39**, 324] and deficiency disorders, and indicates control measures.

Panella (A.). **Il diradamento dei Medicai e il problema della resistenza.** [The dying-off of Lucerne plantings and the problem of resistance.]—*Progr. agric.*, **6**, 7, pp. 779–792, 10 fig. (1 col.), 4 graphs, 1960.

Dying-off of lucerne in Italy appears to be caused by *Corynebacterium insidiosum* [cf. **39**, 591] and various fungi, including *Fusarium* spp. The extent of control obtained by the use of resistant vars. [**37**, 732] so far developed in Italy is indicated. Inoculation tests on material of a very wide genetic basis showed that it is possible to obtain a number of lines definitely resistant to *C. insidiosum*. It remains to be seen whether these are also resistant to the various fungi associated with the condition.

Lott (T. B.) & Keane (F. W. L.). **Leaf enations in Apple inoculated from Cherry.** —*Plant Dis. Reptr*, **44**, 8, pp. 634–635, 2 fig., 1960.

Cherry leaf enation in the Okanagan Valley, B.C., is believed to be the same as cherry rasp leaf virus [**21**, 378] in Colorado, and is similar to the European Pfeffinger disease [=cherry rasp leaf virus: **40**, 57]. Apple seedlings budded with Okanagan cherry material in 1954 displayed rasp leaf and enation symptoms in 1960 on new growth after cutting back, but not pear trees similarly treated.

Cation (D.). **Dwarf fruit and tree decline, a virus disease of Apple.**—*Quart. Bull. Mich. agric. Exp. Sta.*, **42**, 4, pp. 722–727, 3 fig., 1960.

A new virus disease of Hyslop crab apple trees was first observed in 1944 and later

named dwarf fruit and tree decline (*Phytopathology*, **42**, 1, p. 4, 1952). Fruit on affected trees was smaller than normal, distorted, and with 5 lobes. Trees gradually die. When top-grafted with Jonathan scions the fruits in the 4th yr. were uniformly small but normal in shape and taste. The Hyslop trees showed severe stem-pitting. When graft-inoculated to R12740–7A [**39**, 179] symptoms appeared in 14 days and included epinasty, chlorotic mottle, necrosis, and retardation, and on some clones of Jumi and Hopa crab apples mottle, leaf puckering, and necrosis during the 1st yr. Spread by root union is indicated.

Gutenmann (W. H.) & Lisk (D. J.). **Rapid determination of mercury in Apples by modified Schöniger combustion.**—*J. agric. Fd Chem.*, **8**, 4, pp. 306–308, 1 diag., 1960.

The method (*Analyt. Chem.*, **30**, pp. 1152–1153, 1958) is described. At N.Y. State Coll. Agric., Cornell Univ., Ithaca, it was used to determine various phenyl Hg compounds including quinex and metasol DPO, applied against scab [*Venturia inaequalis*] on MacIntosh, Cortland, Red Delicious, Rome Beauty, and Rhode Island Greening. The amounts recovered in the 0·3–0·6 p.p.m. range averaged 83·6%; up to 0·18 p.p.m. was detected in the sprayed fruits [cf. **40**, 77].

Beidas (A. S.) & Higgons (D. J.). **Mercury residues in sprayed crops. II. Apples.** —*J. Sci. Fd Agric.*, **10**, 10, pp. 527–529, 1959.

The most significant points emerging from the writers' previous investigations on Hg residues in sprayed tomatoes (*J. Sci. Fd Agric.*, **8**, 597, 1957) were (*a*) the speed at which the chemical penetrated the pulp, and (*b*) the persistence of the residue. This is a further report from Boots Pure Drug Co. Ltd., Lenton Exp. Sta. and Standards Dept., Nottingham, on similar work with apples [cf. above] in 1956 and 1957, mostly in Kentish orchards, sprayed principally with phenyl Hg $(NO_3)_2.H_2O$. The residue was found to be $< 0{\cdot}01$ p.p.m. in the majority of the samples (over 30) analysed and $< 0{\cdot}1$ in the remainder, with the exception of 1 (Bramley's Seedling) in which 0·1 was detected. In this case (the only one which might give rise to concern) the incorporation of a DDT miscible oil formulation in the spray programme may have affected the persistence of the Hg.

Waugh (Nora M.). **The effect of dinitro-ortho-cresol on Apple buds in relation to the control of mildew.**—*Rep. agric. hort. Res. Sta. Bristol, 1959*, pp. 115–117, [1960].

Spraying Cox's Orange Pippin bush trees in the late dormant stage with 0·1% DNOC in 3% spindle oil reduced the spring outbreak of mildew [*Podosphaera leucotricha*: **39**, 421], apparently by killing mildewed buds which would otherwise have survived to give rise to primary infections. There was often incomplete closure of the bud scales on infected shoots. There was no evidence of killing of overwintered mildew unaccompanied by death of bud tissue. In 1959, when budburst was very early, the mid-Mar. DNOC spray caused considerable damage to healthy buds.

Hervert (V.). **Odolnosť mycelia padlí Jabloňového — Podosphaera leucotricha (Ell. et Ev.) Salm. k nízkým teplotám.** [Resistance of the mycelium of Apple powdery mildew, *P. leucotricha*, to low temperatures.]—*Čes. Mykol.*, **14**, 3, pp. 187–192, 1 graph, 1960. [Germ. summ.]

At Biol. Inst. Czechoslovak Acad. Sci. shoots with buds carrying the overwintering mycelium were cut in Jan. and Feb. and exposed to natural frost up to −20° C. The mycelium was 86% destroyed. It is estimated that total killing could be attained by 3–5 hr. exposure at −20 to −25° C.

Waugh (Nora M.) & Byrde (R. J. W.). **A note on the possible origin of crotch cankers on Apple trees.**—*Rep. agric. hort. Res. Sta. Bristol, 1959*, pp. 112–114, 1 pl., 2 diag., [1960].

Observations and anatomical studies in 1958–9 have shown that crotch cankers caused by *Nectria galligena* [cf. **39**, 422] may arise from infection of injuries induced by excessive meristematic activity during the summer, which ruptures the bark. Though fresh bark tissue is fairly soon regenerated, fissures remain which persist throughout the winter and tend to become waterlogged; the accumulation of water-borne spores at branch junctions becomes a likely source of infection. All crotches that developed cankers, except one from which *Gloeosporium perennans* [*Pezicula malicorticis*] was isolated, later bore perithecia of *N. galligena*.

Spencer (D. M.) & Wilkinson (E. H.). **Further experimental work on the control of Gloeosporium in the store.** —*Plant Path.*, **9**, 2, pp. 49–51, 1960.

Further data are presented from Wye Coll., Kent [cf. **37**, 587], showing that the rotting of Cox's Orange Pippin apples by *G. perennans* [*Pezicula malicorticis*] was markedly reduced by fumigation with 0·1 g. cu. ft. 2:4:5-(trichlorophenoxythio)-trichloromethane in polythene tents. Use in a commercial store has still to be investigated.

Mikhaĭlova (Paraskeva). Глеоспороза (горчиво гнение) по Ябълката. [Gloeosporosis (bitter rot) of Apples.] Овощарство [*Ovoshtarstvo*], **7**, 6, pp. 33–34, 1 fig., 1960.

A report by Inst. Plant Prot., Sofia, on this disease, caused by *Glomerella cingulata* on Kaselska Reneta and Jonathan apples, which was noticed in Berkovitsa. Its symptoms, morphological characteristics, and conditions of development are described. Measures against scab [*Venturia inaequalis*] are considered to be largely effective against gloeosporosis also, together with the removal of mummified fruits and dry branches and wound treatment.

Batt (R. F.) & Martin (J. T.). **The cuticles of Apple fruits.** —*Rep. agric. hort. Res. Sta. Bristol, 1959*, pp. 106–111, [1960].

Further studies [cf. **39**, 379], in which 3 apple vars. were compared at harvest and after storage.

Keane (F. W. L.) & Welsh (M. F.). **Transmissible corky pit of Flemish Beauty Pear.**—*Plant Dis. Reptr*, **44**, 8, pp. 636–638, 2 fig., 1960.

At Res. Sta., Canada Dept Agric., Summerland, B.C., corky pit of Flemish Beauty pear, a disorder in which shallow depressions on the fruit are underlaid by brown, corky flesh, somewhat akin to cork spot of Anjou pear [**16**, 689], was graft-transmitted through Bosc to healthy Flemish Beauty. No symptoms were observed on fruit of the inoculated Bosc pears, which throws doubt on the possible identity of the causal virus with pear stony pit [cf. **26**, 399].

Krejčová (Jaromíra). **Monilinia fructigena (Aderh. et Ruhl.) Honey — příčina hnědé moniliové hniloby peckovin.** [*Sclerotinia fructigena*, the causal agent of brown rot of stone fruit.] *Čes. Mykol.*, **14**, 3, pp. 198–207, 4 fig., 1960. [Russ., Engl. summ.]

Observations over 4 yr. by Agric. Coll., Prague, on stone fruit from 4 regions of Czechoslovakia showed that *S. fructigena* [**30**, 170] was almost invariably the causal agent of such rots. Biologic forms were not distinguished.

Blumer (S.). **Untersuchungen über die Morphologie und Biologie von Tranzschelia pruni spinosae (Pers.) Dietel und T. discolor (Fuck.) Tranz. et Litv.** [Studies on

the morphology and biology of *T. pruni-spinosae* and *T. discolor*.]—*Phytopath. Z.*, **38**, 4, pp. 355–383, 9 fig., 1960. [Engl. summ. 42 ref.]

In Central Europe these rusts are common (the latter more so) on cultivated stone fruit trees (except cherries); *T. pruni-spinosae* [**38**, 529] has aecidia on *Anemone ranunculoides*, and *T. discolor* [**38**, 705] on *A. coronaria*, *A. fulgens*, and other *A.* spp. At the Eidg. Versuchsanstalt, Wädenswil, Switzerland, it was ascertained that in their dikaryotic state both are able to infect plum, peach, apricot, *Prunus cerasifera* var. *myrobalana*, *P. mahaleb*, and *P. spinosa*. No biologic specialization was apparent. In *T. pruni-spinosae* both cells of the teleutospore are exactly alike, to whatever host it is transmitted. In *T. discolor* the basal cell is less differentiated, being small, smoother, paler, and less thick-walled. This sp. varies much more and can be regarded as a reduced or retrogressive form. In some *P.* spp., especially plum, the reaction to attack by *T. discolor* is greater than to *T. pruni-spinosae*; on *P. spinosa* the symptoms of the 2 are quite different. In the climatic conditions of C. Europe both are able to overwinter by means of uredospores.

Azad (R. N.). **'Line pattern' disease of Plum (Prunus domestica L.).**—*Indian J. agric. Sci.*, **29** (*1959*), 1, pp. 61–62, 1 fig., 1960.

A description is given of a disease similar to that caused by plum line pattern virus [cf. **38**, 605] observed in 2 suburbs of Simla. It started with vein-clearing of leaves, particularly older ones, and sometimes extended to veinlets and interveinal areas, until the blades became partially or wholly chlorotic, but they were not malformed or reduced in size. The fruits were very faintly mottled while still green and those on severely affected trees had diffuse chlorotic spots while ripening. Infected scions cleft-grafted on healthy stocks during dormancy developed symptoms on new leaves during the growing season, whereas the stock suckers did not until the following year.

Chiarappa (L.). **Distribution and a mode of spread of Cytospora canker in an orchard of the President Plum variety in California.**—*Plant Dis. Reptr*, **44**, 8, pp. 612–616, 2 fig., 1960.

In studies at the Di Giorgio Fruit Corp., Di Giorgio, Calif., the cankers [**35**, 686] on mature President plum trees averaged 6·4/tree and were most frequent on branches facing south; sun scald injury appears to be an important source of infection. Only 1 of 3 strs. isolated was highly virulent to President plum. The pathogen is possibly *C. rubescens* [cf. **38**, 397]. It readily invaded fresh wounds on the trees and is spread by infected pruning knives.

Heinis (J. L.). **Taphrina pruni-subcordatae (Zeller) Mix, causing witches'-broom on Italian and French Prunes.**—*Plant Dis. Reptr*, **44**, 8, pp. 830–831, 1960.

These plum vars. are new hosts of *T. pruni-subcordatae* [cf. **28**, 548] reported from the State Dept Agric., Salem, Ore. The symptoms caused include witches' broom and leaf curl.

Keener (P. D.). **Peach 'shot hole' in Arizona—1959.**—*Plant Dis. Reptr*, **44**, 8, p. 629, 2 fig., 1960.

A note on a severe outbreak of *Coryneum* [*Clasterosporium*] *carpophilum* [map 188] on Rio Oso Gem peach, in Yavapai County, the 3rd record for Ariz.

Wade (G. C.). **Apricot diseases in Tasmania.**—*Tasm. J. Agric.*, **31**, 2, pp. 242–249, 8 fig., 1960.

The apricot industry in Tasmania has declined in recent years owing to diseases, the most important of which are brown rot (*Sclerotinia fructicola*) [**36**, 653] and *Eutypa* die-back (*E. armeniacae*) [cf. **37**, 93]. Minor diseases and their control are

described; [plum] line pattern virus is widespread and Mn deficiency [**36**, 210] is common.

Zvara (J.) & Kolek (J.). **Poruchy výživy pri apoplexii Marhúl.** [Nutritional disturbances in Apricot apoplexy.]—*Biológia, Bratislava*, **14**, 12, pp. 881–887, 1959. [Russ., Germ. summ.]

Comparative leaf analyses of healthy apricot trees and others with partial and total apoplexy made at the Slovak Acad. Sci., Bratislava, Czechoslovakia [**39**, 480 and below], indicated highly significant differences in the chlorophyll, N, CaO, and MgO contents.

Majerník (O.), Lačok (P.), & Stanová (Maria). **Výskum toxických závislostí niektorých agens vo vztahu k odumieraniu Marhúl (P. armeniaca L.).** [Study on the toxic relationships of certain agents in connexion with the die-back of Apricot trees.] *Biológia, Bratislava*, **15**, 1, pp. 32–52, 7 fig., 3 graphs, 1960. [Russ., Germ. summ.]

Partial or total apoplexy was induced in apricot trees [see above] by inoculation with the mycelia of *Monilia* [*Sclerotinia*] *laxa*, *Trichoderma viride*, *Cephalothecium roseum*, *Cytospora*, *Fusarium*, and *Helicoon* spp., *Stereum hirsutum*, and *Schizophyllum commune*. Both apricots and tomatoes reacted by wilting to filtrates of these spp. and to various inorganic solutions. The several phases of the 'apoplectic' process are traced and the symptoms developing between inoculation and die-back described. Macroscopically visible symptoms, e.g., necroses and loss of chlorophyll from the leaf veins, are interpreted as forerunners of die-back, but the need of microscope studies for confirmation of the diagnosis is emphasized.

Lott (T. B.) & Keane (F. W. L.). **The virus content of flowering Cherries at Summerland, British Columbia.** *Plant Dis. Reptr*, **44**, 8, pp. 632–633, 1960.

At the Res. Sta., Canada Dept Agric., Summerland, B.C., symptomless trees of Kwanzan and Shiro-fugen flowering cherries (*Prunus serrulata*) were found to be infected by K and S virus [**39**, 481], Kwanzan also by Lambert mottle [str. cherry necrotic rusty mottle: **39**, 182] and [cherry] mottle leaf [virus]. Lambert mottle transmitted from Kwanzan to sweet cherry appeared to spread more rapidly under experimental plot conditions than the Lambert mottle from Okanagan Valley orchards.

Corke (A. T. K.). **Black currant leaf spot : treatment of overwintered leaves with fungicides : summary of experiments, 1953–59.**—*Rep. agric. hort. Res. Sta. Bristol, 1959*, pp. 118–122, [1960].

In laboratory tests in the winters of 1953–59 overwintering infection of *Pseudopeziza ribis* [cf. **39**, 724] was checked by brief immersion of leaves in fungicides [**37**, 95], which prevented subsequent ascospore discharge. Observations indicate that only leaves on which the fungus has reached a particular developmental stage at a certain time of the year will carry the fungus through the winter on the ground, the implication being that the initiation of the perfect state depends on the external conditions or the physiological state of the host, or both. It might be practical to give an eradicant spray after cropping and before leaf fall, ensuring that such a spray reached the lower leaf surfaces. Research along these lines is in progress.

Teterev (F. K.). Новый сорт Крыжовника Урожайный. [New Gooseberry variety, Urozhaĭnyĭ.]—*Agrobiology, Moscow, 1959*, 4 (124), pp. 522–529, 6 fig., 1960.

At the All-Union Plant Cultivation Inst., U.S.S.R., grafting of young Belyĭ gooseberry seedlings, which are thorny, have yellow fruit, and are highly susceptible

to powdery mildew [*Sphaerotheca mors-uvae*: cf. **38**, 117, 324], on to black currant is claimed to have produced a new, almost thornless, mildew-resistant var. Urozhaĭnyĭ, with dark red, fairly large, non-falling and long-keeping fruits and with half-woody scions that rooted easily. Green shoots of the susceptible var. Industriya grafted on to 3-yr.-old golden currant plants gave a var., Novaya industriya, which bore colourless berries.

Stoyanov (D.). Да проведем навреме борбата с болестите и неприятелите по Малината. [On the control of diseases and pests of Raspberry in good time.]—Овощарство [*Ovoshtarstvo*], **7**, 6, pp. 24–29, 4 fig., 1960.

A review by Inst. Plant Prot., Sofia, Bulgaria, of the causal agents, including *Didymella applanata* and *Leptosphaeria coniothyrium* [**39**, 120]. In addition there are *Elsinoe veneta* [cf. **37**, 243] causing anthracnose on the vars. Marlborough and Newborough, and *Agrobacterium tumefaciens*. A 1% Bordeaux mixture is recommended generally for control, along with pruning of dry shoots and loosening of the soil before spraying.

Durbin (R. D.), Castillo (B. S.), & King (T. H.). **The occurrence of chlorogenic acid in Strawberry plants affected with crinkle and yellows viruses.**—*Plant Dis. Reptr*, **44**, 7, pp. 536–537, 1960.

At Univ. Minn., St. Paul, the most significant difference between chromatograms of extracts from healthy *Fragaria vesca* plants and those infected by strawberry crinkle or yellows viruses was the presence in the latter, under UV light, of a blue-white fluorescent spot, subsequently identified as chlorogenic acid. The compound was found in the vegetative parts of 9 commercial strawberry vars. known to be infected by these viruses but not in other, healthy plants or in *F. vesca* infected by latent virus A [strawberry latent virus str.] or Frazier's mild mottle virus.

Khristova (Eleonora) & Khristov (L.). Причини на кореновото гниене при Ягодите в България и средства за борба с него. [Causes of root rot in Strawberry in Bulgaria and means of its control.] -Раст. Защ. [*Rast. Zasht.*], **8**, 1, pp. 4–24, 2 fig., 1960. [Russ., Engl. summ. 40 ref.]

A review from Inst. Plant Prot., Sofia, and Fruit Res. Inst., Kostinbrod, Bulgaria, of this disease, especially common in areas with hot dry summers and cold winters. Incidence, ranging from 4·1% in Flandern to 50·9 in Ranna na pazara in test fields, appeared to be due to unfavourable conditions rather than to specific fungi. Effective control was achieved by ameliorative cultural operations and by watering the plants regularly, particularly with 0·25% germisan.

Khan (M. A. R.). **A spraying trial against Strawberry grey mould (Botrytis cinerea).**—*Rep. agric. hort. Res. Sta. Bristol, 1959*, pp. 123–126, 1 fig., [1960].

Karathane, 25% WP, applied at 12 oz./100 gal., and griseofulvin [cf. **37**, 19], 50% WP (2½ lb.), both gave a significant degree of control of *B. cinerea* on Talisman strawberry, though not so good as that usually obtained with thiram or captan [cf. **40**, 58]. Dodine and sorbic acid were ineffective. In this trial no powdery mildew [*Sphaerotheca humuli*: cf. **37**, 545] infection of the fruit was present. These fungicides were not phytotoxic.

Winks (Barbara L.) & Oxenham (B. L.). **Strawberry fruit rots can be controlled.**—*Qd agric. J.*, **86**, 5, pp. 311–313, 2 fig., 1960.

Regular and thorough spraying with 2 lb. captan/100 gal. at 10–14 day intervals controlled *Botrytis cinerea* [cf. above] and *Gloeosporium* sp. [**38**, 21] and increased yields of marketable fruit by 50%.

Meredith (D. S.). **Banana fruit spot caused by Deightoniella torulosa (Syd.) Ell.**—*Plant Dis. Reptr*, **44**, 8, pp. 618–621, 4 fig., 1960.

Fruit spot or speckle is common in most of the banana producing countries of the world. In Jamaican fields Lacatan bananas bear nearly round spots with a reddish-brown or black centre and a darker green, water-soaked halo. The spots increase in number as the fruit matures and are most frequent on the insides of the fingers and towards the tips. *D. torulosa* [**36**, 666 *et passim*] was frequently isolated from these spots, and the disease was reproduced 7 days after spraying healthy bananas with a spore suspension in the field. The production of appressoria and the penetration of the cuticle and epidermal cell wall was observed.

Most of the spots investigated by Wardlaw [**13**, 455] bear little resemblance to speckle.

Prest (R. L.) & Smith (A. E.). **Spikeleaf in the Banana.**—*Qd agric. J.*, **86**, 5, pp. 283–285, 2 fig., 1960.

The symptoms of this disorder suggest the adoption of the following precautionary measures, at least in districts where spikeleaf has occurred or, by reason of location, is likely to occur: select land for bananas with a warm slope; avoid planting at low elevations, especially where topographical features tend to impede the movement of cold air down the slope and away from the plantation; do not apply fertilizers, particularly those high in N, from mid-Apr. to early Sept., as plants making lush growth when a sharp drop in temp. occurs are very susceptible to cold injury; and avoid over-watering during the cooler months, especially on the heavier-textured soils which are normally classed as 'cold'.

The disorder has recently become rather widespread and in 1959 crop loss in several plantations reached commercial proportions.

Hingorani (M. K.) & Singh (N. J.). **Xanthomonas punicae sp. nov. on Punica granatum L.** *Indian J. agric. Sci.*, **29** (*1959*), 1, pp. 45–48, 1960.

At Indian agric. Res. Inst., New Delhi, the pathogen [**33**, 98] (fully described) survived on fallen leaves from Dec. to mid-March and reproduced from mid-March to the end of June, a period of high temp. and low humidity. These conditions seemed to favour the development of the disease.

Ciccarone (A.) & Graniti (A.). **Elsinoë oleae n.sp., novo parasita da Oliveira (Olea europaea L.).** [*E. oleae* sp. nov., a new parasite of the Olive tree.]—*Arq. Inst. biol., S. Paulo*, **26**, 3, pp. 17–21, 2 pl. (8 fig.), 1959.

Sphaceloma oleae Ciccarone & Graniti causing a minor scab disease of olive in Sicily, and the perfect state, *E. oleae* Ciccarone & Graniti, which develops on dying leaves on the ground, are described from Univ. Bari, Italy. The asci are 25–30 × 10–14 and the ascospores 12–15 × 3–4 μ, the conidia 2–3·5 × 3–6 μ.

Sackston (W. E.). **Botrytis cinerea and Sclerotinia sclerotiorium in seed of Safflower.**—*Plant Dis. Reptr*, **44**, 8, pp. 664–668, 2 fig., 1960. [14 ref.]

At the Canada Dept Agric. Res. Sta., Winnipeg, Man., surface-sterilized seeds of safflower and sunflower yielded *Botrytis cinerea* [cf. **27**, 423] and *Sclerotinia sclerotiorum* [**38**, 9]. This is the 1st record of *B. cinerea* as a seed-borne pathogen of sunflower, and of *S. sclerotiorum* in seed of safflower. As both fungi cause head rots, the seeds are probably infected by the spread of hyphae from the capitulum. A number of organic mercury seed treatments give good control.

Bunkina (Mme I. A.) & Bondartsev (A. S.). Новые и редкие виды грибов на Женьшене. **(Species novae et rarae fungorum in Panace Ginseng C.A. Mey**

inventae.) [New and rare fungus species on Ginseng.]—*Bot. Mater.* (*Notul. syst. sect. crypt. Inst. bot. Acad. Sci. U.S.S.R.*), **13**, pp. 130–132, 2 fig., 1960.

Further spp. [cf. below] described are *Phyllosticta panax* and *Mycosphaerella panacis* as new, and *Alternaria panacis*.

Bunkina (Mme I. A.). Итоги изучения болезней Женьшеня. [Results of the study of diseases of Ginseng.] Анализ семян Женьшеня на грибную инфекцию и их предпосевная обработка. [Analysis of Ginseng seed for fungal infection and pre-sowing treatment.]—Матер. Изуч. Женьшеня Лимонника [*Mater. Izuch. Zhen'shenya Limonnika*] 4, pp. 131–162, 23 fig., 1 graph; pp. 163–170, 3 fig., 1960. [34 & 4 ref.]

During these studies [**37**, 498] in plantations of the Suputinskiĭ reserve, Primor'e, 25 fungi were identified; those causing the most serious diseases are the following. *Colletotrichum panacicola* attacks both seedlings and older plants. Initial symptoms were noted on 10 June and max. infection was in July-Aug. *Phytophthora cactorum* started on organs at ground level, passing to the root. Initial symptoms were at the end of May, with widespread infection at the end of June. *Fusarium* spp. occurred on seedlings and on roots of plants of various ages of Primor'e and Korean origin. *Alternaria panax* [cf. above] occurred on weakened plants, frequently with *C. panacicola*. *Corticium solani* was noted on individual seedlings and, more frequently, on mother plants and plants of different ages of both Korean and Primor'e origin. *Plasmopara panacis* first appeared in 1955 on a considerable number of 2–3-yr.-old plants of Korean origin, though it was only on occasional plants in the following year. Root rots were caused by *Ramularia* spp., *Phytophthora cactorum*, and bacteria.

F. martii var. *minus* and *F. sporotrichioides* var. *minus* were isolated from 2 lots of ginseng seed received from N. Korea in 1954–55 and the latter from Primor'e seed. *Acrostalagmus* [*Verticillium*] sp. was also noted on individual seeds. *Colletotrichum panacicola*, *Alternaria panax*, *F.* spp., *Botrytis cinerea*, and *Cladosporium herbarum* were isolated from fruits from Korea and Primor'e. The best laboratory control was obtained by seed treatment with thiram, Na trichlorophenolate, dinitrorhodanebenzene, granosan, and formalin, the last at 1:1,000, with subsequent softening of seed for 2 hr. In the field in 1954 and 1956 at the mountain plantation of the Suputinskiĭ reserve, seed treatment with dinitrorhodanebenzene, thiram, Na trichlorophenolate, and Cu (all 2 g./kg. seed), and 0·5% K permanganate sol. gave the best results.

Edel'shteĭn (L. I.). Материалы к изучению заболеваний Женьшеня в Приморском крае. [Materials for the study of diseases of Ginseng in the Primorskiĭ kraĭ.]—Матер. изуч. Женьшеня Лимонника [*Mater. Izuch. Zhen'shenya Limonnika*] 4, pp. 176–183, 1960.

Material from ginseng plantations at the Suputinskiĭ reserve, Far Eastern Branch Acad. Sci. U.S.S.R. in June–July 1952 was studied at the A. A. Zhdanov Leningrad State Univ. *Fusarium martii* var. *minus* [cf. above], *Trichosporium* sp., and *Colletotrichum panacicola* were isolated from cultivated Korean ginseng; a root rot, apparently bacterial, was also present. *F. sambucinum* var. *minus* and *Trichosporium* sp. were noted on 1–2-yr.-old cultivated Primor'e ginseng plants. *C. panacicola* was serious, infecting at the outset almost all Korean and spreading to the Primor'e seedlings. *Vermicularia dematium* occurred on both Korean and Primor'e plants.

Vasina (Mme A. N.), Kryukova (Mme M. A.), & Shalagina (Mme A. I.). Болезни и вредители Женьшеня в условиях Московской области. [Diseases and pests

of Ginseng in conditions of the Moscow region.]—Матер. Изуч. Женьшеня Лимонника [*Mater. Izuch. Zhen'shenya Limonnika*] 4, pp. 172–175, 1960.

In studies at the All-Union sci. Res. Inst. for Officinal Aromatic Plants, Leninsk district, Moscow region, and local exp. Stas. since 1952, spp. of *Fusarium* [cf. above] and *Sclerotinia* were found to infect ginseng seed and seedlings. *Colletotrichum* also developed on 2- and 4-yr.-old plants. Seed treatment with mercuran and formalin gave good control, and treatment with NIUIF-2 alone (7 g./kg.) or combined with 12% hexachlorane dust (2:1; 14·5 g. kg.) completely inhibited the fungi. Spraying with 1% Bordeaux mixture and 1% Cu oxychloride reduced the number of plants infected by *Colletotrichum* by 20 and 14%, respectively.

Vanev (S.). Сиво гниене — нова болест по Рицина у нас. [Grey rot—a new disease of Castor oil plant in our country.] -Раст. Защ. [*Rast. Zasht.*], **8**, 2, pp. 17–22, 3 fig., 1960. [Russ., Engl. summ. 11 ref.]

This disease, caused by *Sclerotinia ricini* [cf. **39**, 31], affected about 20% *Ricinus communis* plants in an area near Pleven, Bulgaria, in the autumn of 1957. Spraying with 1% Bordeaux mixture and 0·3% captan or dusting with Cu compounds are recommended for control.

Velasco (J. R.), de Guzman (E. V.), & Mercado (B. T.). **Growth of young Coconut plant in sand culture.** *Philipp. Agric.*, **43**, 9, pp. 548–576, 24 fig., 3 graphs, 1960.

Descriptions of the symptoms caused by deficiencies of N, P, K, Ca, Mg, SO_4, and micro-elements [cf. **38**, 131, 311].

Shaw (J. G.). **The amino acid composition of two strains of Potato virus X.**—*Diss. Abstr.*, **20**, 10, p. 3919, 1960.

Purified samples of the yellow str. of potato virus X [**38**, 538] were found to contain twice as much tyrosine as the ring spot str. [**38**, 72] in comparative analyses at the Univ. Wis. Results were inadequate to relate differences in symptom expression with specific differences in amino acid composition.

Kishore (H.). **A recessive type of immunity to virus X in Solanum tuberosum L.** -*Diss. Abstr.*, **20**, 11, pp. 4249–4250, 1960.

At Univ. Wis. progeny of crosses of AG 54·55 potato var., susceptible to potato virus X, with x 137 and x 143, both carrying the immunity type of resistance [cf. **39**, 487] and related to the immune S. 41956, were tested with X^{21}, a ring spot str., given a preliminary serological screening, and the resistant individuals later tested on *Gomphrena globosa*. Resistance in AG 54·55 appears to be controlled by a recessive gene, c, in the nulliplex condition. Together with the locus for the complementary genes A and B, together conferring immunity, C is evidently also generally present.

The genotypic constitution of AG 54·55 would appear to be aaaaBbbbCccc and that of x 143 AAaaBbbbCCcc. Gene c, when present as a homozygous recessive, imparts immunity but does not otherwise affect the expression of A and B, and behaves independently.

The genotypic constitution of x 137 appeared to be AAaaBbbbCccc from S_1 data, but it gave a better fit with the F_1 data for (AG 54·55 × x 137) as AAaaBbbbCCcc.

Bojňanský (V.), Kosljarová (Viera), & Kolef (J.). **Analógia vplyvu gibberelinu a stolburu na kličenie Zemiakových hľúz.** [Analogy between the influence of gibberellin and that of stolbur on the germination of Potato tubers.]—*Biológia, Bratislava*, **14**, 11, pp. 863–867, 2 fig., 1959. [Russ., Germ. summ.]

At the Slovak Acad. Sci., Bratislava, Czechoslovakia, the treatment of Krasava,

Carmen, Voran, and Barka tubers with gibberellic acid in ethanol solution (20μg./tuber) shortly before the inception of germination resulted in the formation of semi- or completely spindle-shaped tubers, morphologically identical with those resulting from infection by [tomato] stolbur virus [**40**, 61]. Hence it is concluded that the symptom in question is caused by toxic substances secreted by the plant and exerting an influence analogous to that of gibberellin.

GREGOR (J. W.). **Director's report. Potatoes.**—*Rep. Scot. Soc. Res. Pl. Breed., 1960*, pp. 15–20, 1960.

During 1959 investigations on breeding for field resistance to potato blight [*Phytophthora infestans*: **37**, 549] were continued at the Station at Pentlandfield, Roslin, Midlothian. Samples of most of 270 seedlings which survived screening tests with race 1,2,3,4 in previous yrs. were tested in the Toluca Valley, Mexico [cf. **39**, 35]. There, resistance to this race remained fully effective in only some of the seedlings and it is evident that the seedlings susceptible in Mexico had been protected at Pentlandfield by at least 1 additional R gene (e.g. R_5) inducing hypersensitivity. By means of this reaction the true 'field resisters' were distinguished. The most promising plants originated from interspecific hybrids involving *Solanum demissum*, *S. phureja*, and *S. simplicifolium*.

Because of the scarcity of blight in the field [in Britain] in 1959 only races 3, 4, and 3,4 were recorded. In material from Italy race 0 was prevalent on tomatoes and 4 on potatoes, while races 3, 2,4, 3,4 and 2,3,4 were relatively uncommon. Potatoes from Brazil were affected mainly by races 4 and 1,4 and tomatoes by 0, 3 and 3,4, races 1,3,4 and 2,3,4 being very limited in distribution.

Two unusual diseases on potato plants in the greenhouse were powdery mildew caused by *Erysiphe polyphaga* f. *matricalis solani tuberosi* [cf. **37**, 504] and a condition caused by *Bacillus subtilis* [**40**, 124].

At Cambridge, Musselburgh, and Pentlandfield, Pentland Crown had fewest infections by potato leaf roll virus and potato virus Y and therefore appears to possess resistance to both.

The effect of ryegrass mosaic virus [cf. **38**, 736; **39**, 589] on the yield of S 22 Italian ryegrass [*Lolium multiflorum*] was estimated. On 16 July the yield of diseased plants of 1 clone was 56·5% and on 21 Aug. 59·5% of that of healthy plants, while the diseased plants of another clone gave 18·4% on each occasion. At the 3rd and final harvest on 14 Oct. the yield of diseased plants of the 2nd clone was 21·3% that of the healthy but infection had spread to the originally healthy plants of the 1st clone and there was only 15·4% difference in yield.

BLACK (W.). **Races of Phytophthora infestans and resistance problems in Potatoes.**—*Rep. Scot. Soc. Res. Pl. Breed., 1960*, pp. 29–38, 1960. [10 ref.]

Recent work on physiologic races of *P. infestans* [cf. **36**, 661] is reviewed in relation to resistance [see above] with special reference to the differentiation, geographical distribution, and origin of the different races and breeding for field resistance. Evidence now suggests that in *Solanum demissum* there are probably 6 rather than 4 R genes which, differently combined, would enable distinction of 64 races. The number of races, low on potato, increases in a country as more vars. with R genes are cultivated. Field resistance, as opposed to hypersensitive response, gives some protection against all races, is inherited polygenically, and may be combined with commercial qualities.

DENWARD (T.). **Växtförädling med Potatis.** [Breeding Potatoes.]—*Sver. Utsädesfören. Tidskr.*, **70**, 1–2, pp. 17–58, 7 fig., 1 graph, 1960. [Engl. summ. 48 ref.]

Among the problems discussed in this up-to-date survey is that of selection for

resistance to disease at the headquarters of the Swedish Seed Ass., Svalöf, where special attention is directed towards the elimination of the major diseases.

Umærus (V.). **Iakttagelser rörande fältresistens mot bladmögel (Phytophthora infestans (Mont.) de By) hos Potatis.** [Observations concerning field resistance to blight (*P. infestans*) in Potato.]—*Sver. Utsädesfören. Tidskr.*, **70**, 1–2, pp. 59–89, 6 fig., 1 diag., 5 graphs, 1960. [Engl. summ. 27 ref.]

Field resistance to *P. infestans* [see above] is considered to fall into 2 categories, resistance to penetration and to invasion, respectively, the former entailing delay or prevention of spore germination, growth, and penetration and the latter arrest of mycelial spread and sporulation. A method of inoculation is described for the uniform and reproducible distribution of a spore suspension for inoculations on detached leaves which are placed in specially constructed incubators at a constant temp. of 18° C. and R.H. 100%. The shelves and bottom of the chamber are covered with wet peat overlaid by paper wadding, while the inside of the walls is lined with detachable boards of porous masonite soaked in water.

The min. period for the development of infection after inoculation of the lower leaf surface of Ackersegen was 8 hr. and for the slightly less field-susceptible Svalöf's Anna 3 hr., the latter contracting a max. of 40% more lesions than the former. There was an even greater difference between the reactions of Anna and some Mexican clones of *Solanum demissum* × *S. tuberosum*, the leaflets of the former being covered with primary necroses in contrast to the few produced on the latter.

Resistance to invasion is characterized by a protracted growing period, reduced sporulation, and slow spread of infection. The course of mycelial growth could be roughly followed by inspection of the extension of the necroses, while varietal differences were expressed in a close correlation between mycelial spread and the rate of defoliation of Ackersegen (resistant), Alpha, President (intermediate), and Bintje (susceptible).

Plants grown under short day-length (10 hr., compared with 17 for July) lost their resistance to *P. infestans*, irrespective of varietal characteristics, while peroxidase activity [**38**, 619] also fell by an av. of 40% in the 4 above-mentioned vars. It is concluded from these investigations that a short life-cycle of the host, accompanied by early tuber formation and precocious physiological maturity, whether induced by short day-length or inherited genetically, gives plants with little or no resistance to blight.

Selection for field resistance should comprise 2 steps: a screening of seedlings for resistance to penetration; and selection for resistance to invasion among the survivors. The 1st involves spraying seedlings in flats with a spore suspension under conditions favouring infection, which are maintained for 10–15 hr., followed by rapid drying. Those with a long min. infection period will not be attacked and can be transplanted for subsequent tests, preferably the peroxidase [**39**, 614].

Toxopeus (H. J.). **Studies on the resistance of tuber-bearing Solanaceae from Mexico to Phytophthora infestans.**—*Euphytica*, **9**, 1, pp. 39–56, 1960. [Dutch summ.]

At the Inst. agric. Plant Breeding, Wageningen, numerous wild tuber-bearing spp. and vars. of *Solanum* from Central America and the adjoining regions of the U.S.A. were tested against several races of *P. infestans*. *S. bulbocastanum* and *S. polytrichon* exhibited a valuable degree of resistance, possibly attributable to genes for hypersensitivity, in addition to field resistance [**39**, 339]. In extensive cross-breeding experiments *S. bulbocastanum* proved difficult, but *S. polytrichon* showed more promise. The author comments on cases of deviation from the international scheme of relations between R genes and races of the parasite, leading him to

conclude, *inter alia*, that very poor sporangial development cannot be taken as evidence of the absence of the R gene, while the interpretation of the presence of scattered sporangia is a matter of conjecture [cf. **37**, 553 and above].

Rosser (W. R.). **Fungicidal control of Potato common scab.**—*Plant Path.*, **9**, 2, pp. 61–62, 1960.

In trials against *Streptomyces scabies* [cf. **39**, 36] at heavily infested sites in the W. Midlands pentachloronitrobenzene (now given the common name quintozene) was applied to the open drills before planting at a range of rates equivalent to 0–100 lb./acre. In 1958 scab incidence was extremely low and significant control was obtained at 100 lb./acre, but in 1959 infection was high and there was no significant control.

Pontis (R. E.) & Feldman (J. M.). **Powdery mildew of Potato in Argentina.**—*Plant Dis. Reptr*, **44**, 7, p. 595, 1960.

In Mar. 1960 an *Oidium* was observed on leaf petioles and stems of Up-to-Date potato in the valley of Las Carreras, Mendoza, a new record for Argentina. No perithecia were found [cf. **29**, 581].

Sampson (P. J.) & Fountain (P. J.). **Storage diseases of Potato tubers and their control.**—*Tasm. J. Agric.*, **31**, 2, pp. 137–143, 7 fig., 1960.

Among the principal diseases encountered in stored tubers in Tasmania are dry rot (*Fusarium solani* f. *radicola*), gangrene (*Phoma foveata*) [cf. **38**, 767; map 210], watery wound rot (*Pythium ultimum*), pink rot (*Phytophthora erythroseptica*) [cf. **38**, 766], skin spot (*Oospora pustulans*) [cf. **38**, 621], dry rot (*Colletotrichum atramentarium*), *Sclerotinia sclerotiorum*, and bacterial soft rot [unspecified]. Descriptions are given of symptoms and control with advice on storage.

Malcolmson (Jean F.). **A disease of Potatoes and Tomatoes caused by Bacillus subtilis.**—*Rep. Scot. Soc. Res. Pl. Breed., 1960*, pp. 24–28, 1960.

In the spring of 1959 parts of the leaves of potato plants in a greenhouse at Pentlandfield, Midlothian, became dark, as if splashed with oil, while on the abaxial surface veins in the affected areas were black and surrounded by watersoaked dark green tissue. In a few days the discoloured parts became dry and brown; severely affected leaves often wilted and dropped. When the leaf symptoms were apparent the axillary buds and shoots were dead and die-back of the shoots developed. On the tubers, particularly at the rose end, the eyes were dead and occasionally the adjacent tissue rotted. Affected material yielded *B. subtilis* [cf. **31**, 320; **34**, 112] only. Inoculations of potato plants with isolates from affected plants by pricking to introduce the bacteria directly (*a*) into the vascular tissue and (*b*) under the epidermis gave positive results, the bacteria being re-isolated from the vascular tissue of the stems and tubers.

Experimental evidence demonstrated that the disease is tuber-borne and that the bacillus is also pathogenic to tomato plants.

Paquin (R.), Lachance (R.-A.), & Coulombe (L.-J.). **La production des enzymes pectiques par Corynebacterium sepedonicum.** [The production of pectic enzymes by *C. sepedonicum*.]—*Canad. J. Microbiol.*, **6**, 4, pp. 435–438, 1 graph, 1960. [Engl. summ.]

At the Lab. des Rech., Min. Agric. Canada, Ste-Anne-de-la-Pocatière, Que., no production of pectin methylesterase, depolymerase, polygalacturonase, or protopectinase by *C. sepedonicum* [**39**, 733] was detected on synthetic media containing pectins, nor were these enzymes found in potatoes with severe ring rot.

HARRAP (F. E. G.). **Some aspects of the potash nutrition of the Potato.**—*J. Sci. Fd Agric.*, **11**, 6, pp. 293–298, 3 graphs, 1960. [29 ref.]

The results of studies from 1956–58 at Levington Res. Sta., Ipswich, Suffolk, have demonstrated, *inter alia*, that high N and low K soil amendments tend to give rise to stem-end blackening [**23**, 76; **39**, 71]. The opt. rate of K application for the production of a high-quality crop varies with the nature of the soil, but 200 lb. K_2O acre would appear to be a good av. value. The available evidence suggests that K_2SO_4 is superior to KCl as a K source.

HUGHES (C. G.). **The diseases of Sugar Cane in North Queensland.**—*Cane Gr. quart. Bull.*, **24**, 1, pp. 22–26, 1 fig., 1960.

Most of the information in this popular account has already been noticed [**39**, 344 *et passim*]. It is virtually certain that gumming disease [*Xanthomonas vasculorum*: **30**, 582] has been eradicated from the area since 1950. Pokkah boeng [*Gibberella fujikuroi*] is controlled by the use of resistant vars. Commercial losses from ratoon stunting [virus] are now almost negligible. Dusting with a Cu formulation will control yellow spot [*Cercospora kopkei*: **39**, 734].

FORBES (I. L.) & LING (K. C.). **Particles associated with the ratoon stunting disease of Sugarcane.**—*Sug. J., N. Orleans*, **23**, 2, p. 15, 2 fig., 1960.

On an air-dried collodion membrane under the electron microscope at La State Univ. droplets of sap from plants infected by ratoon stunting virus showed roughly spherical particles av. 31·9 mμ diam., similar in size to several other spherical viruses and presumed to be responsible for ratoon stunting, and others 7·3 mμ diam. like those in tomato plants infected by tobacco mosaic virus; these have been detected repeatedly in sugarcane sap with ratoon stunting virus, of which they may well be a by-product.

VAN DER ZWET (T.), FORBES (I. L.), & STEIB (R. J.). **Studies on the Phytophthora rot of Sugarcane seed pieces in Louisiana.**—*Plant Dis. Reptr*, **44**, 7, pp. 519–523, 3 fig., 1960.

In further studies at Dept Plant Path., State Univ., La [**39**, 345], the 'sterile' *Phytophthora* isolate [**35**, 489] produced oospores on sterilized oats at 70° F. and sporangia when these were placed in water; it was identified as *P. megasperma*. Infection spread more rapidly in inoculated seed pieces of N.Co. 310 than in C.P. 36–13.

GORDON (M. P.) & SMITH (C.). **Multiplication of Tobacco mosaic virus in a normally insusceptible host.** *J. biol. Chem.*, **235**, 6, p. PC 28, 1 graph, 1960.

At the Dept Biochem., Univ. Wash., Seattle, the inoculation of *Rhoeo discolor* leaves with the ribonucleic acid from TMV resulted in infection in 8 identical experiments, whereas the intact virus did not multiply in this plant. The infectious material produced appears to be very similar to the parent virus, being resistant to ribonuclease, had rod-shaped particles under the electron microscope, and all the infectious units were sedimentable at 60,000 *g* for 1 hr. It induced local lesions on Xanthi tobacco, extracts from which caused typical systemic infection in Turkish tobacco, the virus from the latter being unable to attack *R. discolor*.

RAPPAPORT (I.). **The reversibility of the reaction between rabbit antibody and Tobacco mosaic virus.** —*J. Immunol.*, **82**, 6, pp. 526–534, 1 diag., 4 graphs, 1959. [30 ref.]

At the Dept Bot., Univ. Calif., Los Angeles, TMV and its homologous rabbit antiserum were shown to combine in a manner characteristic of a reversible reaction. The amount of antibody bound is a function of the antibody-virus concs., independent of mixing procedure.

Siegel (A.). **Studies on the induction of Tobacco mosaic virus mutants with nitrous acid.**—*Virology*, **11**, 1, pp. 156–167, 1960.

At the Botany Dept, Univ. Calif., Los Angeles, nitrous acid was found to be highly mutagenic for TMV [cf. **39**, 124]. Of 5 properties studied, symptoms in tobacco and lesion size in *Nicotiana glutinosa* were the most frequently affected: the type of response on *N. sylvestris* was only occasionally altered. No isolates were altered in respect of serologic specificity or pH of isoelectric precipitation. Data suggest that during nitrous acid treatment 1 mutagenic deamination occurs for every 2 or 3 lethal deaminations, and that every deamination has a detectable biological effect.

Buzzell (Anne). **Action of urea on Tobacco mosaic.**—*J. Amer. chem. Soc.*, **82**, 7, pp. 1636–1641, 3 graphs, 1960.

At the Dept Biophys., Univ. Pittsburgh, Pa, experiments were designed to elucidate the seemingly paradoxical nature of the mechanism of urea action on tobacco mosaic virus [cf. **23**, 44; **37**, 79]. Within 20 min. at 0° C. 6 M urea degraded the virus into apparently intact ribonucleic acid with a sedimentation const. of $S_{20}W_{30}$ and into the smallest subunit of protein with $S_{20}W$ about 20. Intact monomer virus proved to be less stable than fragments. The former was degraded in 2 min. to rods ranging from $\frac{2}{3}$ to $\frac{1}{2}$ the original length, measured in electron micrographs, and after 6 min. further disintegration of these stable intermediates began. There was no appreciable degradation of the fragments in 6 min. but they were largely gone in 20.

Francki (R. I. B.) & Matthews (R. E. F.). **Effect of 2-thiouracil on the infectivity of Tobacco mosaic virus.**—*Biochim. biophys. Acta*, **34**, pp. 570–571, 1959. [Received June 1960.]

Jeener (*Ibid.*, **23**, p. 351, 1957) reported that TMV incorporating 2-thiouracil [cf. **38**, 279; **39**, 399, 683] multiplied more slowly in tobacco than the normal virus. The present authors, at the Univ. Auckland, N.Z., found that normal and thiouracil virus samples from White Burley tobacco did not differ in regard to the size distribution of rods 15 mμ wide. However, infectivity tests suggested that 50–80% of the thiouracil virus particles were non-infectious.

Knypl (J. S.) & Gubanski (M.). **The inhibitory effect of coumarin on the Tobacco mosaic virus (TMV). Reproduction in Tobacco leaf discs.**—*Naturwissenschaften*, **47**, 13, pp. 308–309, 1960.

At the Dept Plant Physiol., Univ. Łódź, Poland, coumarin inhibited reproduction of the virus from White Burley tobacco in half leaves of *Nicotiana glutinosa* at a min. conc. of 2 p.p.m. and exerted its max. potency at 2,000 p.p.m., reducing the number of local lesions/10 half leaves from 3,588 to 6; at 2,000 p.p.m., however, it was phytotoxic. On the basis of evidence so far available the inhibitory process is believed to operate through changes in the normal cell metabolism.

Bovyr (A. D.). Вплив сироватки коров'ячого молока на вірус Тютюново мозаїки. [The effect of cow's milk whey on Tobacco mosaic virus.]—*J. Microbiol., Kiev*, **22**, 3, pp. 47–51, 1960.

In tests at the Inst. Microbiol., Kiev, cow's milk whey [cf. **38**, 543] considerably depressed TMV activity *in vitro* and in detached leaves of *Nicotiana glutinosa* and Havanna tobacco [cf. **39**, 347]. Spraying with the whey for 6 days strongly reduced TMV activity, especially if applied before inoculation. The whey and the milk from which it is derived have practically the same antivirus activity.

Izard (C.) & Berg (T. M.). **A new method of identifying Tobacco mosaic and Potato X viruses by paper chromatography : application to the study of the relations**

between Broomrape and Tobacco when these viruses are present.—*Ann. Inst. exp. Tabac Bergerac*, **3**, pp. 215–225, 1959. [*Chem. Abstr.*, **54**, 15, col. 15541 g, 1960.]

This information on the relation between broomrape [*Orobanche ramosa*] and tobacco and the presence of the 2 viruses has been noticed [**38**, 191].

Miczyński (K. A.). **Studies on the free aminoacid composition of Tobacco plants infected with Potato virus X.**—*Acta biol. cracov.*, **2**, 1, pp. 23–33, 1 diag., 1959. [31 ref.]

At the Coll. Agric., Cracow, Poland, an increased conc. of amino acids and amides was noticed in the still symptomless leaves of White Burley plants inoculated with a non-necrotic, ringspot str. of the virus, and in leaves with primary lesions [**38**, 249]. During the rapid systemic spread of the virus amino acid conc. was lower than in healthy leaves. Older plants with the disease well-established showed a general tendency towards increase in conc. over that in healthy plants. A steady increase of aspartic acid and leucine was accompanied by a decrease of glutamic acid in diseased tissues. The changes in amino acid metabolism appear to be non-specific for any particular virus.

Schlegel (D. E.). **Highly infectious phenol extracts from Tobacco leaves infected with Cucumber mosaic virus.**—*Virology*, **11**, 2, pp. 329–338, 2 graphs, 1960.

At the Dept Plant Path., Univ. Calif., Berkeley, the aqueous phase of a homogenate of infected leaves in a phenol-tetrasodium pyrophosphate mixture was found to be up to 6·6 times as infectious as extracts of similar leaves prepared without phenol [**39**, 561]. The infectious agent in the phenol extract was highly sensitive to ribonuclease, more stable in 67% alcohol than in distilled water, and had an UV absorption curve typical for nucleic acid.

Orieux (L.). **A survey of Tobacco diseases in Mauritius.**—*Rev. agric. sucr. Maurice*, **39**, 2, pp. 92–98, 4 pl., 1960.

Much of this information has been noticed [**38**, 373; **39**, 374]. The most important pathogen is *Cercospora nicotianae*. Other diseases noted during the survey included angular leaf spot (*Pseudomonas angulata*), though 'wildfire' [*P. tabaci*] does not occur, hollow stalk (*Erwinia carotovora*), and powdery mildew (*Erysiphe cichoracearum*).

Kosswig (W.). **Blauschimmel-Krankheit des Tabaks und ihre Bekämpfung in den Saatbeeten mit Paradichlorbenzol.** [Blue mould disease of Tobacco and its control in the seed-beds with paradichlorobenzene.]—*Dtsch. Tabakbau*, **40**, 7, pp. 59–62, 1960. [*Tobacco Abstr.*, **4**, 5, p. 281, 1960.]

Peronospora tabacina [**40**, 63] was virtually ubiquitous in N. Germany in 1959 while small outbreaks also occurred in the centre and S.W. The disease was effectively combated by 4 treatments with paradichlorobenzene every 3rd night, the tablets being placed on a gas-permeable substance, e.g. gauze, whence gas is released at a temp. of 23°–26° C. They are removed from the glass- and frame-covered seed-beds during the daytime.

Ivancheva-Gabrovska (Todora). Устойчивост на някои сортове Тютюни спрямо чернилката **(Phytophthora parasitica var. nicotianae).** [Resistance of some Tobacco varieties to 'black-shank' (*P.p.* var. *nicotianae*).]—Раст. Защ. [*Rast. Zasht.*], **8**, 1, pp. 25–31, 1960. [Russ., Engl. summ.]

At Inst. Plant Prot., Sofia, 53 Bulgarian vars. and prospective new lines all proved moderately to highly susceptible to *P.p.* var. *nicotianae* [**34**, 80]. Of 14 foreign vars. assayed, Dixie Bright 101 (immune), Oxford 3, and Huang Mian Ju 79 are recommended for breeding resistant hybrids.

Cole (J. S.). **Field spray trials against wildfire and angular leaf spot of Tobacco in Rhodesia.**—*Ann. appl. Biol.*, **48**, 2, pp. 291–298, 1960. [10 ref.]

At the Tob. Res. Bd Rhod. Nyasald, Salisbury, S. Rhodesia, various antibiotics were compared with Cu fungicides against wildfire (*Pseudomonas tabaci*) [cf. **37**, 313] and angular leaf spot (*P. angulata*) [**39**, 210]. With streptomycin-sensitive strs. of *P. tabaci* streptomycin at 440 μg./ml. gave the best control. In 1 test, however, strs. of *P. tabaci* developed which were resistant to streptomycin and this was followed by a rapid failure of control. In comparison with oxytetracycline, neomycin, chlortetracycline, and Cu oxychloride against *P. tabaci* streptomycin was the only effective spray. Cultures isolated at the end of the work were resistant to all the antibiotics except chlortetracycline, but they lost their pathogenicity during laboratory tests. Cu, on the other hand, usually gave reasonable protection. Oxytetracycline sometimes gave little or no control, and neither neomycin nor chlortetracycline gave encouraging results. When variants resistant to streptomycin were used oxytetracycline+streptomycin at ¼-strength+Cu oxychloride at ½-strength was slightly better than full-strength Cu or ½-strength Cu+oxytetracycline. Half-strength streptomycin+Cu was slightly better than full-strength Cu or ½-strength streptomycin+oxytetracycline against a mixture of streptomycin-resistant and sensitive variants of *P. tabaci*. However, the high price of streptomycin makes its use for the control of wildfire and angular leaf spot of tobacco unsatisfactory in Rhodesia at present.

Sinadskiĭ (Yu. V.) & Bondartsev (M. A.). Некоторые трутовые грибы на лиственных породах в пойме реки Урал. **(Nonnullae Polyporaceae in arboribus frondosis in valle inundato fluminis Ural.)** [Some polypores on deciduous trees in the flooded R. Ural valley.]—*Bot. Mater.* (*Notul. syst. sect. crypt. Inst. bot. Acad. Sci. U.S.S.R.*), **13**, pp. 222–232, 5 fig., 1 graph, 1960.

Symptoms and characters are given of *Polyporus squamosus* [cf. **36**, 671] attacking white willow (*Salix alba*), elm, and ash-leaved maple (*Acer negundo*; incidence up to 71%); *Inonotus obliquus* [*Poria obliqua*] on living and less frequently on dead trees, including elm; *Phellinus* [*Fomes*] *pomaceus* parasitizing wild plum (*Prunus spinosa*) trees, particularly in the neighbourhood of oak and elm forests (up to 90%); *Phellinus lonicerinus* on Tatar honeysuckle (*Lonicera tatarica*) growing among the undergrowth in the tracts along the river (up to 80%); and a new form *P. laevigatus* f. *rhamni* on *Rhamnus cathartica* (av. 19%). Rots caused by most of these spp. are associated with the occurrence of various pests, which are specified.

Gutsevich (S. A.). Новые виды грибов на **Phellodendron amurense Rupr.** и на **Adenophora taurica Sukacz.**, собранные в Крыму. [New fungus spp. on *P. amurense* and *A. taurica* collected in Crimea.]—*Bot. Mater.* (*Notul. syst. sect. crypt. Inst. bot. Acad. Sci. U.S.S.R.*), **13**, pp. 264–268, 5 fig., 1960.

Diagnoses are given of 5 n. spp. found on wood or bark conserved at Univ. Leningrad.

Oganova (Mme É. A.). О конидиальной стадии гриба **Endoxylina stellulata (Rom.) Rom.**—возбудителя рака стволов Ясеня. [On the conidial state of *E. stellulata*—the causal agent of Ash stem canker.]—*Bot. Mater.* (*Notul. syst. sect. crypt. Inst. bot. Acad. Sci. U.S.S.R.*), **13**, pp. 271–273, 6 fig., 1960.

Libertella fraxinea [**38**, 425] is validly described. That this sp. is the imperfect state of *E. stellulata* [loc. cit.] was confirmed by a discovery in the infected bark of a series of transition types between conidial and ascal with the gradual formation of perithecia and an increasingly dark colouring. Single ascospore cultures of *E. stellulata* bore acervuli of *L. fraxinea*.

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